



AnyMedia[®] Access System

(24 Channel)

Feature Supplement—

Integrated Access Terminal

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Integrated Access Terminal
Feature Supplement
363-211-127 Issue 5 Date: October 2002

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About this Document

Overview

Purpose

This Feature Supplement—Integrated Access Terminal (hereinafter referred to as the Integrated Access Terminal feature supplement) provides the following information for support of Lucent Technologies AnyMedia® Access System integrated access terminal (IAT) feature:

- An overview of the IAT feature
 - Specific information about the features, benefits, applications, and operation of supported *AnyMedia* Access System IATs
 - Configuration and engineering information for planning purposes.
-

Intended audience

This document provides the information necessary to plan and engineer equipment for AnyMedia Access System and its supported IATs and is intended for the following users:

- Network planners
 - Engineers.
-

Issue

This is Issue 5 of the AnyMedia® Access System (24 channel), *Feature Supplement—Integrated Access Terminal*.

Reason for reissue

This feature supplement is being reissued to provide information about the following:

- Describe the *ConnectReach* 200 Series (referred to as *ConnectReach* 200) as an IAT supported by the *AnyMedia* Access System.

- The *ConnectReach* Plus Terminal is no longer supported.
 - SOCKS is no longer supported in the *ConnectReach* Terminal.
 - IPX functionality is no longer supported in the *ConnectReach* Terminal.
 - To make other minor revisions, clarifications, and updates throughout the material.
-

Content

This document contains the following information:

- An overview of the IAT feature
- A description of the IAT feature and its components
- Applications, services, and interfaces of the IATs
- Operations for the IAT feature
- Planning and engineering information
- Table of contents, acronym list, glossary, and index for the document, which help readers find desired information quickly and easily
- A comment form so readers can give feedback to improve the next version of the document.

For ordering information, see the AnyMedia® Access System, *Ordering Guide*, code 363-211-125.

**Document
organization**

This document includes the following chapters, which provide details of the *AnyMedia* Access System IAT feature:

- *About this Document*
Defines the purpose of the document and the intended audience. Also includes topics about the conventions used in the document, related documentation, how to order documents, and how to comment on this document.

Part I, AnyMedia Access System IAT Feature
Chapters 1 through 6 describe the IAT feature generically.
- *Chapter 1, Introduction*
Describes the features, benefits, applications, and services of the *AnyMedia* Access System when it is configured as an IAT host.
- *Chapter 2, IAT Feature Applications and Services*
Describes the applications and services provided when the *AnyMedia* Access System is configured as an IAT host.
- *Chapter 3, System Configurations*
Describes the *AnyMedia* Access System feature configuration options in support of IAT services.

- *Chapter 4, Product Description*
Provides information about the *AnyMedia* FAST™ shelf and the common system circuit packs and describes the IAT Servers.
- *Chapter 5, OAM&P for IAT Services*
Describes the OAM&P operations of the *AnyMedia* Access System for IAT services.
- *Chapter 6, System Planning and Engineering for IAT Services*
Describes the engineering information required to incorporate the IAT feature into the *AnyMedia* Access System and telecommunications network, which includes capacities, traffic engineering, and default system provisioning parameters.

Part II, ConnectReach Terminal and ConnectReach 200 Series
Chapters 7 through 11 describe the ConnectReach™ Terminal and ConnectReach™ 200 Series, two IATs supported by the *AnyMedia* Access System.

- *Chapter 7, Introduction*
Summarizes the features, benefits, applications, and services of the *ConnectReach* Terminal and *ConnectReach* 200 Series.
- *Chapter 8, Features and Benefits*
Describes the features and benefits of the *ConnectReach* Terminal and *ConnectReach* 200 Series.
- *Chapter 9, Applications and Services*
Describes the basic *ConnectReach* and *ConnectReach* 200 Series applications supported by Lucent Technologies and the services provided by the *ConnectReach* Terminal and *ConnectReach* 200 Series.
- *Chapter 10, Product Description*
Provides detailed descriptions of the *ConnectReach* Terminal and *ConnectReach* 200 Series.
- *Chapter 11, OAM&P*
Describes the *ConnectReach* Terminal and *ConnectReach* 200 Series operation interfaces. Preconfiguration and provisioning information also is described.
- *List of Acronyms*
Lists the acronyms used to replace the longer expressions the acronyms represent.
- *Glossary*
Defines terms that are used in this document.
- *Index*
Lists in alphabetical order the specific subject information in the document.

Conventions Used in this Document

Terms used

The following are terms used in the IAT feature supplement that may have a different meaning than the general or common use of the term.

- In the *AnyMedia* Access System, the term *access* means that the system provides the primary service interface for the customer to enter the network.
- Traditional digital loop carrier (DLC) services refer to traditional telephony services, which include plain old telephone service (POTS), coin, integrated services digital network (ISDN), and two-wire locally switched, nonswitched, and nonlocally switched services.
- Special services refer to two-wire and four-wire nonswitched and nonlocally switched special services.
- Voice frequency (VF) is used generically to define POTS, two-wire and four-wire special services, ISDN, digital data services (DDS), enhanced business services (EBS) P-Phone, and digital bypass pair and DC alarm circuits to an existing DLC system. VF growth is used generically to define the growth or addition of these services.
- Digital data services (DDS) refer to 64 kbps clear channel digital service provided between the customer and the central office (CO).
- IAT features apply to all integrated access devices (IADs) that are supported by the *AnyMedia* Access System, including the *ConnectReach* Terminal and *ConnectReach* 200 Series.

Acronyms and abbreviations

In the first three chapters, acronyms are spelled out in lower case letters the first time they are used. Acronyms are also expanded if the section topic is specifically about the acronym. All acronyms may be found in the Acronym list located in the back of the document.

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Related Documentation

Document list, packaging, and formats

The following documentation is available for the *AnyMedia* Access System:

Available on the Web

- *AnyMedia* Access System Documents
 - 363-211-125, *AnyMedia*® Access System, *Ordering Guide*
<http://www.lucent8.com/library/AnyMediaOrderingGuide.pdf>
 - Other *AnyMedia* Access System documents, including System Release Descriptions (SRDs) and the Navis™ *AnyMedia* Element Management System (EMS), can be found by going to <http://www.lucent8.com>, selecting “Documents”, then selecting “Product Line: AnyMedia” (under “Enter 1 or more search items below”) and “Search Now”.

An SRD is issued per release and describes the functionality of the system at the time of release.

Available on CD-ROM

363-211-103, *AnyMedia*® Access System, *Documentation*, which is a CD-ROM that contains the following documents in various formats:

- *AnyMedia* Access System Documents
 - 363-211-254, *AnyMedia*® Access System, *Product Data Sheets* (in PDF format)
 - 363-211-101, *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide* (APOG) (in PDF format)
 - 363-211-106, *AnyMedia*® Access System, *Feature Supplement—MDS2 Shelf Configurations* (in PDF format)
 - 363-211-127, *AnyMedia*® Access System, *Feature Supplement—Integrated Access Terminal* (in PDF format)
 - 363-211-128, *AnyMedia*® Access System, *Feature Supplement—Central Office Terminal* (in PDF format)
 - 363-211-125, *AnyMedia*® Access System, *Ordering Guide* (in PDF format)
 - 363-211-102, *AnyMedia*® Access System, *Installation Manual* (in PDF format)
 - *AnyMedia*® Access System, *Commands and Procedures* (363-211-100, in HTML format, also includes PDFs of selected procedures)
 - 363-211-129, *AnyMedia*® Access System, *ConnectReach™ Terminal User's Guide* (in PDF format)
 - 363-211-212, *AnyMedia*® Access System, *ConnectReach™ Series 200 User's Guide* (in PDF format)

- 363-211-520, AnyMedia® Access System (24 Channel) Optical Network Unit Installation Manual for Outdoor Applications (in PDF format)
- 363-211-521, AnyMedia® Access System (24 Channel) Optical Network Unit Installation Manual for Indoor Applications (in PDF format)
- **SLC Documents**
 - SLC Series 5 Carrier System J1C182BC-1 Remote Terminal Ring Shelf, *User Manual* (in PDF format)



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An *Adobe Acrobat* Reader is provided to view all PDF files. For documents in HTML format, users need and must supply their own Web browser to view them. The documentation has been verified using the following Web browsers: *Netscape Navigator 4.0* and *Internet Explorer 5.0* or later.

The *AnyMedia* Access System Management Interface, which includes the graphical system interface (GSI) and the Network Maintenance Manager, is available on CD-ROM.

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Overview

This document includes the applications and engineering planning information for the *AnyMedia* Access System when supporting the integrated access terminal (IAT) feature. It also contains generic information to support IAT products using a standard signalling interface or a feature enhanced interface that supports specific IATs.

Features and value

The *AnyMedia* Access System, when supporting the IAT feature, enables telecommunications suppliers to offer flexible services to small- and medium-sized businesses and yet retain the fundamental values of the *AnyMedia* Access System.

The set of services that can be deployed at an IAT are voice, digital data, private branch exchange (PBX) functions, router capability, and firewall.

The *AnyMedia* Access System supports up to 80 server ports from each *FAST* shelf. Each port provides either a high bit rate digital subscriber line-second generation (HDSL2) or a digital signal, level 1 (DS1) interface that can be delivered to end customers over a large variety of facilities. The end customer is served by an IAT with either a D4-compatible interface or a feature enhanced interface that supports specific IATs. The IAT feature of the *AnyMedia* Access System can be customized to the service and cost needs of the end customer.

When the *AnyMedia* Access System is configured to support IAT hosting, the following values are delivered:

- GR-303 and integrated network access (INA) interfaces to the network. This allows the *AnyMedia* Access System to collect the various services from a large collection of IATs and groom and concentrate them for maximum efficiency for the service provider.

- Concentration over large line sizes. The *AnyMedia* Access System can support up to 1920 channels between the *AnyMedia* Access System and the IATs and can deliver them to a GR-303 local digital switch (LDS) with fewer LDS interfaces. When the *AnyMedia* Access System is serving 1920 lines on IATs and 20 feeders are delivered to a GR-303 LDS, the concentration ratio is 4:1. The minimum concentration ratio with a fully loaded system is 1.6:1 (using 2-port IAT Servers and supporting 768 lines on IATs).
- An HDSL2 or DS1 interface that allows the service provider to choose the most efficient transport to the IAT. Choices include T1 carrier, HDSL2, synchronous optical network (SONET) facilities, and wireless.
- Efficient use of outside plant facilities by using DS1 transport to combine the end customer's service needs. Other applications may require the use of multiple, partially filled facilities at a much higher cost.
- A mix of IAT Servers, MDS2 servers, and other APs.

The service provider can select from a wide variety of IATs on the market today with the choice based on end customer service needs and cost. The feature set of the selected IAT is based on the IAT manufacturers' value added designs.

Two basic IAT interfaces are available on the *AnyMedia* Access System:

- D4 (PUB 43801)—A large variety of premises equipment products are available that will operate with this interface.
- Feature enhanced—This interface can be used with two Lucent products, the *ConnectReach* Terminal and *ConnectReach* 200. These products have enhanced features for PBX and Internet services and also can be remotely managed from an *AnyMedia* Access System terminal.

Applications and services

Figure 1-1 on page 1-3 shows a typical *AnyMedia* Access System IAT feature application. At the IAT end customer location, an IAT specific to the end customer's needs is chosen. The figure shows an IAT that supports plain old telephone service (POTS) (voice) lines, analog or digital trunks to a PBX, and high speed Internet access. Some IATs can provide PBX functionality as well as other services.

Figure 1-1 also shows the facility from the *AnyMedia* Access System to the IAT location. This facility can be any medium that supports DS1 capabilities, such as T1 carrier, HDSL2, SONET, or DS1 capable radio. Each *AnyMedia* Access System can support up to 80 IATs in up to 80 different locations.

The *AnyMedia* Access System with the IAT feature can provide concentrated GR-303 services to an LDS. In addition, direct inward dialing (DID) trunks, foreign exchange (FX) lines, and other special services from the IAT can be routed through the *AnyMedia* Access System's INA interfaces. This interface also can

support digital data services (DDS) to corporate networks or Internet access to the end customer.

The service provider has the choice of location for the *AnyMedia* Access System providing the service capability. The *AnyMedia* Access System may be collocated with the service provider's LDS. In this application, the *AnyMedia* Access System provides local concentration and INA fill benefits. The service provider also can deploy the *AnyMedia* Access System in a remote building, hut, or controlled environment vault (CEV) located according to standard outside plant planning practices. Finally, the service provider, acting as a network service provider, could install the *AnyMedia* Access System in an existing local exchange carrier's central office (CO) if unbundling rules permit.

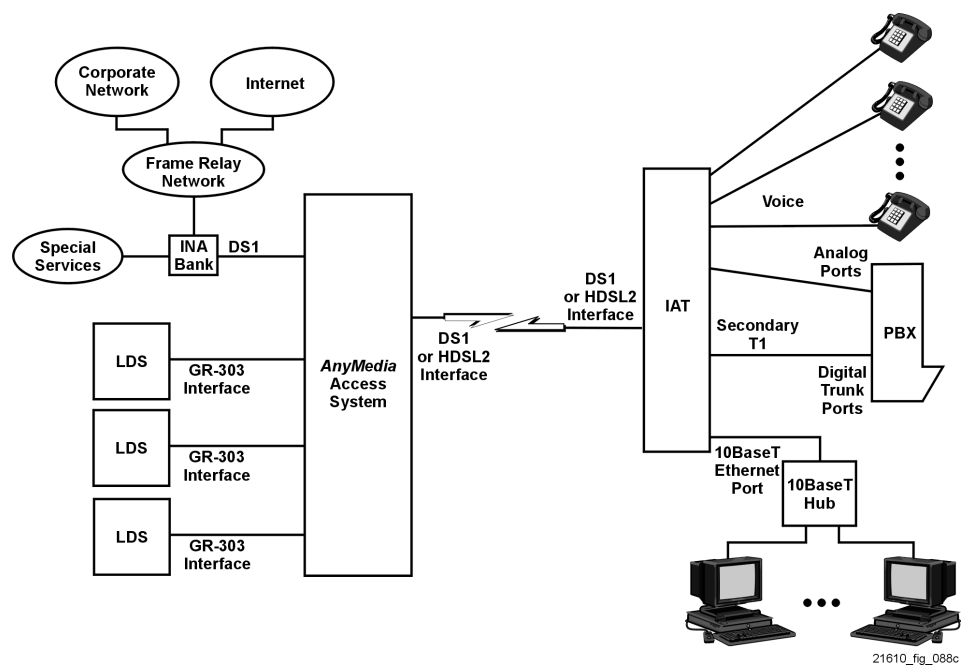


Figure 1-1. Basic *AnyMedia* Integrated Access Terminal Feature Architecture

Overview

This chapter discusses the applications and services provided by the *AnyMedia* Access System IAT feature.

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Applications

Overview

The *AnyMedia* Access System, when used as a host for IAT services, provides most of the features of the *AnyMedia* Access System. Listed below are the key values of the *AnyMedia* Access System equipped with the IAT feature:

- COMDAC, CTU, and IODS1 common packs are used with the same functionality as in a voice *AnyMedia* Access System.
- Integrated GR-303 LDS and INA interfaces are supported (no TR-NWT-000008* for IAT lines).
- Simplified operations, administration, maintenance, and provisioning (OAM&P) operations are provided via the graphical system interface (GSI) of the *AnyMedia* Management Interface.
- All *FAST* shelf list numbers support the IAT feature.
- In the *FAST* shelf, IAT Servers can be mixed with all other application packs (APs) including xDSL packs, an AFM, and the MDSU.
- Sixteen IAT Servers, providing up to 80 ports, may be installed in one *FAST* shelf.
- IAT Server cables (Y-cables) are needed to connect DS1 ports from the IAT Server to a DSX-1 cross connect.
- Standard voice frequency (VF) cables are used for IAT Servers with HDSL2 interface.
- If the *FAST* shelf is equipped exclusively with DS1 IAT Servers, no fans are needed; baffles are sufficient. Fans are required when HDSL2 IAT Servers are used.
- No ringing generator or ringing power cables are required for IAT-only systems. These are required if other APs are mixed with IAT Servers.
- An *AnyMedia* Access System fully equipped with IATS2 Servers can support 32 IATs. When fully equipped with IATS5 Servers, the *AnyMedia* Access System can support 80 IATs. When it is fully equipped with IATS4 Servers, the *AnyMedia* Access System can support 64 IATs.
- When working with the *ConnectReach* Terminal and the *ConnectReach*200, the ClearReach™ feature is also available. This feature requires voice frequency data enhancement (VFDE) in the *AnyMedia* *FAST* shelf.

* TR-NWT-000008, "Digital Interface Between the SLC-96 Digital Loop Carrier System and a Local Digital Switch," Issue 2 (Telcordia Technologies, Inc., August, 1987) plus Revision 1, September 1993

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- For specially designed IAT products such as the *ConnectReach* Terminal and *ConnectReach* 200, a remote operations facility data link feature of the *AnyMedia* Access System allows remote provisioning of these IATs (see *Chapter 5, OAM&P for IAT Services* for more detail).
-

Services

Overview

The *AnyMedia* Access System provides a variety of locally switched, nonlocally switched, and nonswitched services. Services are described separately for the *ConnectReach* Terminal and *ConnectReach* 200 and the standard D4 interface.

The type of IAT determines the services available via the *AnyMedia* Access System. Two types of IATs are supported as logical subshelves of the *AnyMedia* Access System—IAT01 and IAT02. The subshelf type IAT01 refers to both the *ConnectReach* Terminal and *ConnectReach* 200. The subshelf type IAT02 refers to the industry standard (nonproprietary) D4 type of IAT.

***ConnectReach* Terminal and *ConnectReach* 200 (IAT01) services**

Services available for the IAT01 include the following:

- Two-wire POTS
- Two-wire loop start (2LS) with and without line-side answer supervision*
- Two-wire ground start (2GS) with and without line-side answer supervision*
- Direct inward dialing (DID)—dial pulse terminating (DPT) (*ConnectReach* Terminal only)
- Foreign exchange station (FXS) lines and trunks (*ConnectReach* Terminal only)
- 64 kbps clear channel data for Internet access
- Multiple channels of 64 kbps data (Nx64)

The *ConnectReach* Terminal and *ConnectReach* 200, referred to as IAT01 by the *AnyMedia* Access System, require matching provisioning and equipage to provide these services. The *AnyMedia* Access System and the IAT01 communicate via a data link on the DS1 or HDSL2 line between the IAT Server and the IAT01 terminal to compare the provisioning and equipage. If provisioning at the *AnyMedia* Access System matches the provisioning and equipage at the *ConnectReach* Terminal or *ConnectReach* 200, then these services will operate. If there is a mismatch, those lines that have a mismatch will be out of service.

These IAT01 services require the following hardware and provisioning in the *ConnectReach* Terminal and *ConnectReach* 200:

* Line-side answer supervision is not supported when the *ClearReach* feature is enabled.

Table 2-1. Hardware and Provisioning Requirements for the *ConnectReach* Terminal and *ConnectReach* 200

Service	Hardware	DSO Provisioning	<i>ConnectReach</i> Terminal Provisioning ^a	<i>ConnectReach</i> 200 Provisioning ^a
POTS	FXS	analog	440	440
2LS	FXS	analog	440	440
2GS	FXS	analog	440	440
DID/DPT	FXO or FXS	analog	456	Not applicable
FXS	Secondary T1	sec-voice	443	Not applicable
2LS	Secondary T1	sec-voice	400	Not applicable
64 kbps	Data	data	452	452
Nx64	Data	data	452	452

^aAlso referred to as "phantom CU".

D4 interface (IAT02) services

The IAT02 interface is the industry standard (nonproprietary) D4 interface. This flexible interface allows the end user to choose from a wide variety of IATs available.

Services for the IAT02 include the following:

- 2-wire POTS
- 2LS with and without line-side answer supervision*
- 2GS with and without line-side answer supervision*
- DID—DPT
- FXS lines and trunks
- 64 kbps clear channel data for Internet access
- Multiple channels of 64 kbps data (Nx64)
- Foreign exchange office (FXO) lines and trunks
- E&M
- Transmission only (TO).

There must be a match between the provisioning at the *AnyMedia* Access System and the provisioning and equipment at the IAT02 for these services to operate, but

* Line-side answer supervision is not supported when the *ClearReach* feature is enabled.

the *AnyMedia* Access System does not verify the IAT02 provisioning and equipage and declare mismatches, as in the IAT01 case.

Overview

This chapter details the *AnyMedia* Access System configuration options in support of IAT services only. Refer to the *AnyMedia® Access System, Applications, Planning, and Ordering Guide* for details on configuration options when *AnyMedia* Access Systems with APs are used or are mixed with *AnyMedia* Access Systems with IAT services.

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<i>Remote Terminal Bay Configurations</i>	3-7
<i>Additional Equipment Cabling</i>	3-8
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Configuration Options

Overview

Configuration options of the *AnyMedia* Access System in support of IAT services include the following:

- Central office (CO) bay arrangement
- Remote terminal (RT) bay arrangement
- Single system arrangements (single *FAST* shelf).

This section discusses these configuration options and how they can be used to support VF growth and IAT service applications.

CO bay arrangement

The CO bay arrangement of the *AnyMedia* Access System is used for applications that will require the *AnyMedia* Access System RT equipment placed in bays in a CO environment. This arrangement provides a solution for competitive access applications where a network service provider establishes a switching center at a convenient location and transports DS1-based facilities from the network service provider's digital switch to the *AnyMedia* Access System RT. The IAT Servers in the *AnyMedia* Access System RT are connected to the IATs, such as the *AnyMedia* Access System *ConnectReach* Terminal and *ConnectReach* 200, via DS1 server cables.

Typical installations in COs require installation of equipment in bays that have access from both the front and rear of the bay. Server connections are through DSX cross connects to the required server transport facilities such as T1 carrier, HDSL2, SONET transport, or DS1 capable radio. Specific bay and shelf arrangements for the CO are described in *Central Office Bay Arrangements* on page 3-4.

Both flush mount and RT-bay type arrangements are available.

RT bay arrangement

The RT bay arrangement of the *AnyMedia* Access System is used for applications that will require the *AnyMedia* Access System RT equipment to be placed in bays in an RT environment. The RT bay arrangement provides a solution for supporting IAT Servers in a local exchange carrier environment. The *FAST* shelf is placed in a bay in an indoor environment such as a hut, a CEV, or in a subscriber's equipment room.

These applications may mount the bays against walls or in back-to-back arrangements to conserve space with front-only access of the bays. Server connections are through cross connects to the required server transport facilities

such as T1 carrier, HDSL2, SONET transport, or DS1 capable radio. Specific bay and shelf arrangements for the RT are described in *Remote Terminal Bay Configurations* on page 3-7.

**Single shelf
arrangements**

Single shelf arrangements are used for applications needing less than a complete bay of equipment, such as small applications and slow growth applications. Single shelf arrangements are described in *Single System Arrangements* on page 3-12.

Central Office Bay Arrangements

Overview

The *AnyMedia* Access System can be mounted in a bay with front and rear access, which typically is used in a CO environment. The system may be installed in a CO bay line up in a flush mount arrangement.

For the CO environment, the *AnyMedia* Access System can be mounted in a seismic 7-foot RT bay (ED8C800 type). The bays are 26 inches wide, accept *AnyMedia* Access System shelves with 23-inch mounting centers, and up to four *FAST* shelves can be installed in a single bay.

**NOTE:**

All equipment described in this section are specified in Appendix C, *Floor Plan Data Sheets*, of the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*. These are separately orderable items listed in the *AnyMedia*® Access System, *Ordering Guide*.

Optimized *FAST* shelf bay arrangement

The optimized *FAST* shelf bay arrangement for all DS1 IATS2 and IATS5 Servers is equipped with four *FAST* shelves and convection cooling equipment. Figure 3-1 on page 3-5 shows the natural convection optimized *FAST* shelf bay arrangements and the shelf mounting arrangement from the front of the bay.

If *FAST* shelves filled exclusively with DS1 IAT Servers are mixed with *FAST* shelves with APs, the *FAST* shelves with DS1 IAT Servers must use baffles above the shelf. The *FAST* shelves with HDSL2 IATS4 Servers and/or APs must have either fans or baffles above, based on design criteria in the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*.

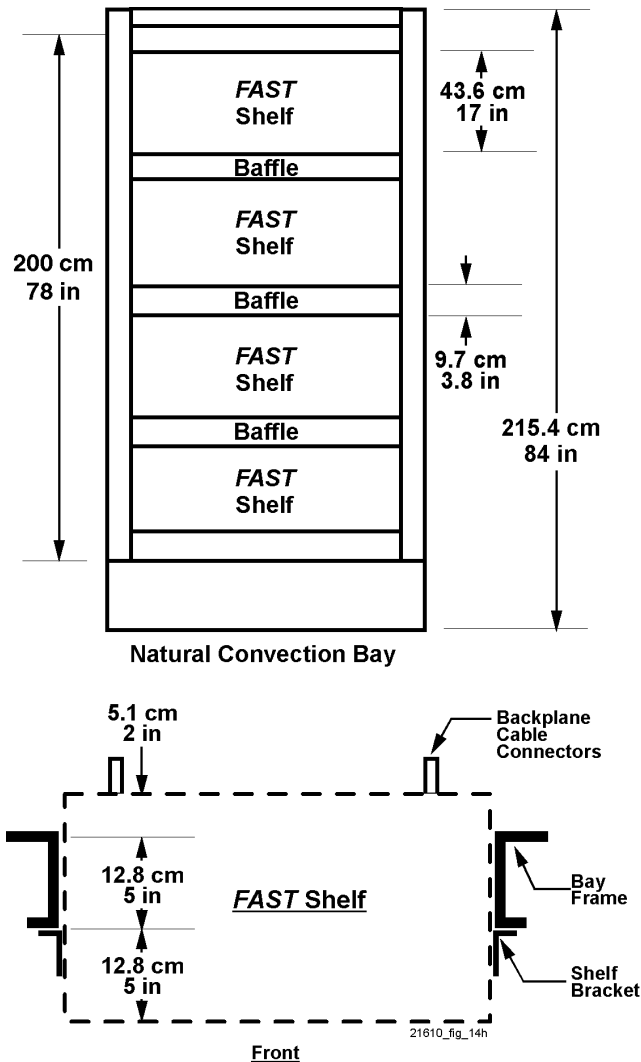


Figure 3-1. Optimized *FAST* Shelf Bay Arrangements with RT Mount

An optimized *FAST* shelf bay arrangement offering consists of the following components:

- Four shelves per bay.

Central office flush mount bay

The CO flush mount bay can be used similarly to the RT mount CO bay described in *Optimized FAST shelf bay arrangement* on page 3-4. The flush mount bay would be used to align with other equipment in a CO aisle that is flush-mounted. Figure 3-2 on page 3-6 shows the shelf-to-bay arrangement of the flush-mounted bay. The flush mounting requires both front and rear access.

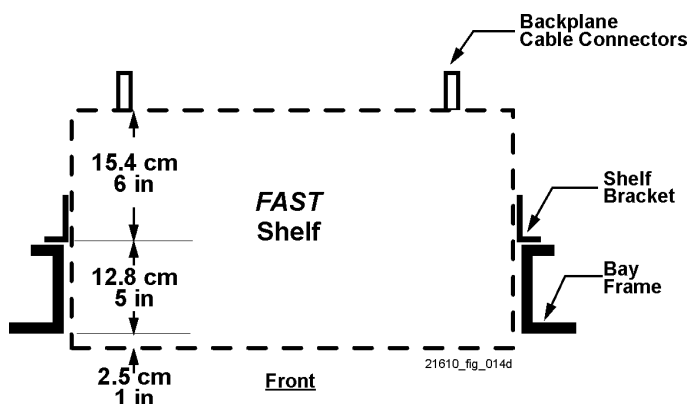


Figure 3-2. Flush-Mounted *FAST* Shelf Bay Arrangement

Natural convection bay with heat baffles

Figure 3-1 on page 3-5 shows a bay configuration for natural convection. A heat baffle, which dissipates the thermal emissions generated by the shelf, is placed above the shelf so the thermal emissions from the shelf do not affect any other shelf's performance. Heat baffles should be used in IAT Server applications, as specified for the *FAST* shelf in Appendix C, *Floor Plan Data Sheets*, of the AnyMedia® Access System, *Applications, Planning, and Ordering Guide*.

Figure 3-1 shows the heat baffles, which are approximately 3 inches high and are installed above each shelf except the top shelf. A *FAST* shelf containing only DS1 IAT Servers does not require fans for heat dissipation. *FAST* shelves containing HDSL2 IATS4 Servers require fans.

Remote Terminal Bay Configurations

Overview

The *AnyMedia* Access System can be placed in bays, huts, CEVs, subscriber premises, or anywhere that traditional DLC is deployed. The bay arrangements are the same as those used for the CO configuration except that typically the RT bays are mounted against walls or in back-to-back arrangements to conserve space. Typically, these installations have front-only access.

For the RT environment, the *AnyMedia* Access System is mounted in a seismic 7-foot RT bay (ED8C800 type). The bays are 26 inches wide, accept *AnyMedia* Access System shelves with 23-inch mounting centers, and up to four *FAST* shelves can be installed in a single bay.



NOTE:

All equipment described in this section are specified in Appendix C, *Floor Plan Data Sheets*, of the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*. These are separately orderable items listed in the *AnyMedia*® Access System, *Ordering Guide*.

Additional Equipment Cabling

Overview

The *FAST* shelf cabling required to support the DS1 IAT feature differs from the AP application since the VF cables are replaced by DS1 server cables. Also, local ringing is not required. Details of the cabling needs of the *AnyMedia* Access System IAT feature are contained in this section.

HDSL2 IATS4 Servers require standard VF cables (see *HDSL2 IAT Server distribution cables* on page 3-10).

FAST shelf cabling locations

In CO applications, the *FAST* shelf is mounted into either a CO type or RT type bay. With a flush mount shelf mounted in a CO type bay, the cable duct is in the rear. In an RT type bay, the cable duct is in front. A cable trough is located at the bottom front of the shelf. The DS1 server cables plug into the faceplate connector of each IAT Server. Each DS1 cable from the IAT Server routes into the *FAST* shelf cable trough, exits the side of the shelf and feeds into the associated bay cable duct. DS1 cables from eight IAT Servers are routed out the right side of the shelf, and the DS1 cables from the other eight IAT Servers are routed out the left side of the shelf.

For flush mounting, input/output (I/O) cables from the backplane (including DS1) feeders, local area network (LAN) interface, etc., are routed along the backplane to the side of the shelf and up the bay between the shelves of adjacent bays. These are not routed in the bay cable duct. For RT mounting applications, all cables are routed in the bay cable duct.

Associated equipment

Generally, the following equipment must be connected to the system to support its complete operation. There may be alternatives to the identified equipment, and specifically recommended equipment is identified as known or needed. In COs, this equipment may be shared over many *AnyMedia* Access Systems or among many different other equipment types not related to the *AnyMedia* Access System access application. These components can be installed in the *AnyMedia* Access System bays or may be placed in adjacent bays or remote locations in the office or building.

- Power plant or power consumption needs
- Transport equipment and facilities
- DSX-1 cross-connect

Power plant or power consumption needs

The amount and type of power needed for the system bay and for associated equipment are specified in the *FAST Shelf Powering* section of Chapter 10, *System Planning and Engineering for Traditional DLC Services*, of the *AnyMedia*®

Access System, *Applications, Planning, and Ordering Guide* and in Appendix C, *Floor Plan Data Sheets*, of the *Applications, Planning, and Ordering Guide*. This power plant could be unique to the application of the *AnyMedia* Access System or shared with other office equipment.

Transport equipment and facilities

A choice of products can be offered including a fiber multiplexer like digital data multiplexer (DDM)-2000, SLC[®]-2000 access resource manager (ARM) shelf, T1 carrier office repeater bays, or other DS1 level transport equipment. The *FAST* shelf DS1 transport interface is based on the T1.102 standard so that a large selection of transport systems are compatible with the *AnyMedia* Access System.

DSX-1 cross-connect

A *FAST* shelf connects to transport equipment at a DS1 level. Therefore, a DSX-1 cross connect panel must be available and placed at a location within equalization range of both the transport system and the *FAST* shelf. This distance is wire-gauge dependent, typically no more than 655 feet from each terminal for 22-gauge wire. DSX-1 cross-connects are required for both *AnyMedia* Access System DS1 transport to the LDS and for the IAT Server DS1 transport.

Mixed shelf cabling

The engineer should carefully plan for the type of cabling required for the *FAST* shelf based on service needs. The duct space and shelf trough cannot hold both VF and DS1 IAT Server cables simultaneously. The recommendations below assure that the *FAST* shelf usually is equipped to support VF AP services.

- If the forecast shows that the shelf will be used predominately for VF APs, only VF cables need to be installed.
- If the forecast shows that the shelf will be used exclusively for DS1 IAT Servers (IATS2 and IATS5), only DS1 IAT Server cables need to be installed.
- If the shelf may need to support a mix of VF APs, HDSL2 IAT Servers (IATS4), and DS1 IAT Servers, it is recommended that the shelf be equipped initially with a full set of VF cables. This guarantees that VF growth can be accommodated without having a major cable installation activity. Procedures are available to remove VF cables from the shelf and install DS1 IAT Server cable with a minimum of effort. The removed VF cables can be stored in the duct or in the rack over the bay for possible future use.
- The installation of a full set of DS1 IAT Server cables for the case immediately above is not necessary since the installation of DS1 IAT Server cables is simpler due to fewer pairs terminated and the smaller size of the cables. In addition, the use of DS1 IAT Servers also requires adding other equipment, such as transport equipment and DSX-1 cross-connects, which results in a significant installation activity.

- In large installations, it is also recommended that VF services be segregated from DS1 IAT services so that whole shelves can be cabled for each service type, as suggested in the first two bullet items above.

Cabling—detailed description

Required cabling includes the following:

- DS1 cables for office facilities
- DS1 cables for server transport
- HDSL2 IAT Server distribution cables (standard VF cables)
- Power cables
- Operations connection cables
- Miscellaneous alarm cables
- CO output alarm cables.

DS1 cables (facility)

Each *FAST* shelf can terminate 20DS1 circuits from the transport facility on five IODS1 packs. A sixth pack provides 1:5 protection of the five in-service IODS1 packs. The protection IODS1 pack has no DS1 cabling connections. Connection to the transport facility, separating transmit and receive pairs, is required. These cables terminate at the DSX-1 panel.

DS1 cables (server transport)

For IATS2 and IATS5 Servers, Y-cables connect to the faceplates of the servers and pass through the cable trough to the sides of the bay. Different Y-cable types are needed for each IAT Server type. The IATS2 Server supports two DS1 interfaces, and the IATS5 Server supports five DS1 interfaces. The Y-cables are split into DS1 transmit and DS1 receive paths with connectors on the ends. Additional cables connect to the ends of the Y-cable to be routed to a DSX-1 panel. The IATS2 Y-cable faceplate connector is a 15-pin D-sub, and the IATS5 Y-cable faceplate connector is a 25-pin D-sub.

HDSL2 IAT Server distribution cables

The IATS4 Server, which provides an HDSL2 interface, uses the same 32-port VF cable used by POTS APs. This cable connects to the faceplate of the IATS4 Server via the same type of connector that is provided on all APs. The first four pairs provide the HDSL2 interface. The remainder of the pairs are not active.

Power cables

Cables are provided for two –48V inputs and returns to the *FAST* shelf. Appropriate grounding (single-point or mesh) is also specified for the bay.

Operations connection cables

For IAT related services, the GSI or TL1SI terminal connects via a cable to an EIA-232E/574 compatible connector on the faceplate of the craft test unit (CTU) and to the com port on the personal computer (PC) or TL1SI terminal. A PC equipped with an Ethernet LAN card also can be connected to the 10BaseT LAN connection on the *FAST* shelf.

Miscellaneous alarm cables

Miscellaneous discrete input alarms require cables that come from a connector on the backplane of the *FAST* shelf. For front-only access in RT applications, the cables are accessed from a connection to a dangler cable. Two connectors (J111, J111A) are used for miscellaneous alarm inputs, such as the cabinet door alarm. These are connected to the CTU slot on the *FAST* shelf.

CO output alarm cables

Alarm signals output from an office alarms cable via a J110 dangler on the backplane. Alarm signals from the connector are routed to the CTU slot on the *FAST* shelf.

Single System Arrangements

Overview

For applications that need less than a complete bay of equipment, such as those listed below, the customer could consider a single *FAST* shelf:

- Small applications that require up to 80 IATs
 - Slow growth applications.
-

Small applications

If the application requires up to 80 IATs, which is the capacity of a single *FAST* shelf, the shelf could be mounted in available space in any available bay with the same physical characteristics as the ED8C800-50 type bays described in *Central Office Bay Arrangements* on page 3-4. A heat baffle is required above each *FAST* shelf equipped exclusively with DS1 IATS2 and IATS5 Servers except when the *FAST* shelf is mounted at the top of the bay.

Fans are required when a *FAST* shelf contains one or more HDLS2 IATS4 Servers.

Slow growth applications

If more than one shelf of equipment may be needed but growth is slow, it may be preferable to install a single *FAST* shelf at a time. The first shelf should be installed at the bottom of the bay using the same mounting holes as specified in the AnyMedia® Access System, *Installation Manual, Chapter 2* for a full bay of equipment. The bay type should be the same as specified for the fully equipped bay. Subsequent shelf additions are installed from the bottom up, using heat baffles. Each shelf should be associated with a heat baffle mounted above it except for a shelf at the top of the bay (see Figure 3-1 on page 3-5).

Overview

This chapter provides information about the *FAST* shelf, the common system circuit packs, and the IAT Server.

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<i>AnyMedia Access System Apparatus Codes</i>	4-6
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<i>Circuit Packs—COMDAC COM101, COMDAC COM102</i>	4-8
<i>Circuit Packs—CTU DTP101, CTU DTP102, CTU DTP103</i>	4-9
<i>Circuit Pack—IATS2 LPS100</i>	4-10
<i>Circuit Pack—IATS4 LPS104</i>	4-15
<i>Circuit Pack—IATS5 LPS105</i>	4-20

AnyMedia FAST Shelf Description

Overview

The *FAST* shelf is the main shelf in the *AnyMedia* Access System. When it is configured as an IAT-only host, the *FAST* shelf supports the following:

- Up to 6 IODS1s
- Up to 2 COMDACs
- 1 CTU
- 16 IAT Servers.

There are six possible *FAST* shelf choices based on the applications described in the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*. The choices depend on whether the shelf is front and rear access or front-only access and on the type of powering.

Shelf arrangement

The *AnyMedia FAST* shelf shown in Figure 4-1 on page 4-3 is arranged to accommodate 6 small and 19 large circuit packs, all on 25 mm horizontal spacing. From left to right, the shelf contains the following:

- 6 IODS1 packs
- 2 COMDAC packs
- 1 CTU
- 16 IAT Servers.

A cable trough is located at the bottom front of the shelf. The cables plug into the faceplate connectors of the IAT Servers. These cables are routed vertically down into the cable trough and are routed vertically down to the cable trough. Then the cables are routed horizontally through the trough to either side of the shelf; half of the cables exit the trough on the right side, and half on the left side. After exiting the trough, the route of the cables depends on the application, as follows:

- RT bay applications—Into the bay cable ducts
- Flush-mounted applications—Under the shelf for routing in the bay cable ducts in the rear.

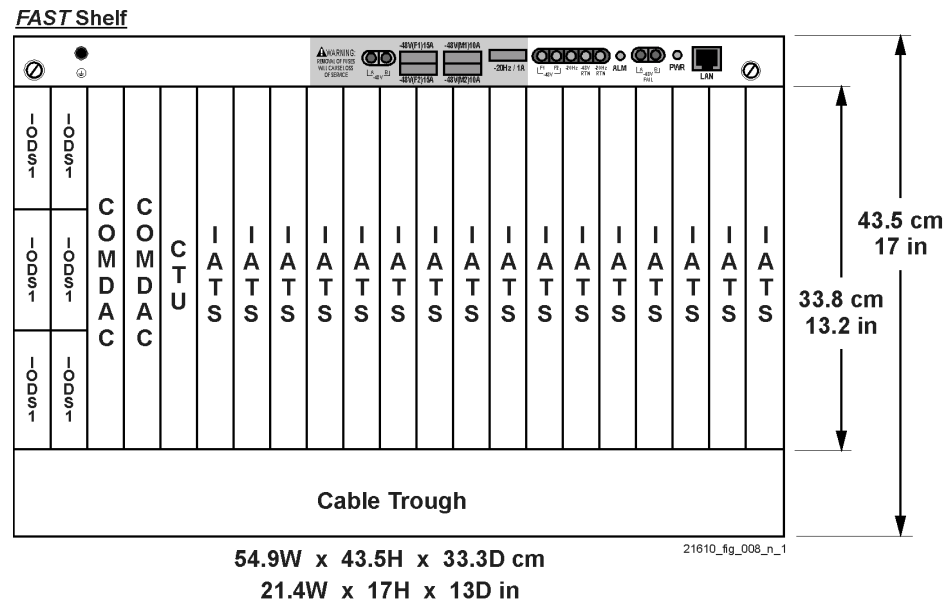


Figure 4-1. AnyMedia Access System FAST Shelf Arrangement

Functional block diagram

Figure 4-2 on page 4-4 provides a functional block diagram of the AnyMedia FAST shelf equipped exclusively with IAT Servers. This figure shows the relationships of the circuit packs described in the rest of this chapter.

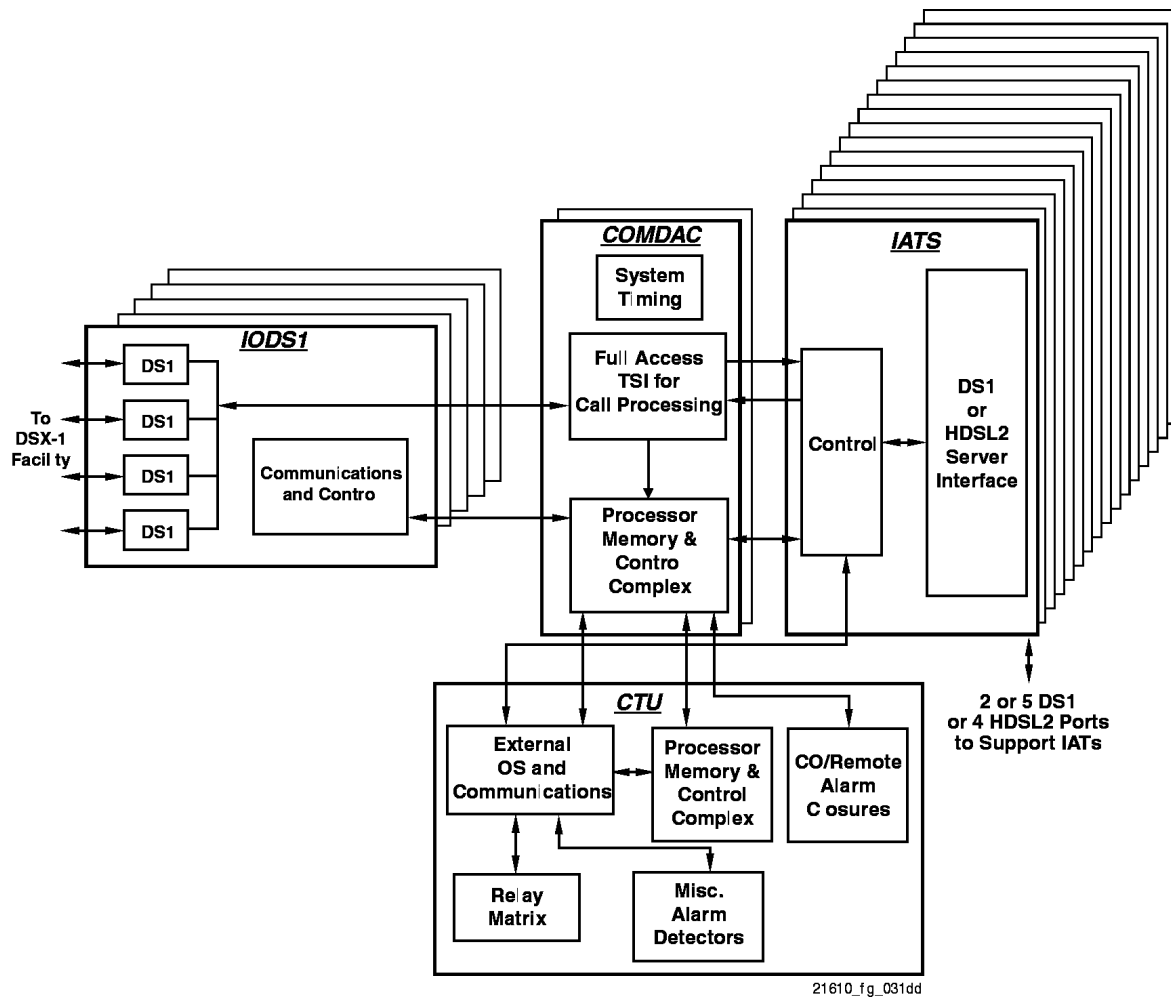


Figure 4-2. Functional Block Diagram of the FAST Shelf Fully Equipped with IAT Servers

Circuit Pack Common Functions and Characteristics

Overview

All the circuit packs, which includes the IAT Servers, designed and manufactured for the *FAST* shelf of the *AnyMedia* Access System have certain common functional and physical characteristics.

Functionality

All *AnyMedia* Access System circuit packs have the following common functionality:

- Built-in self-test and fault diagnostics, as applicable
 - Status LED indicators and buttons (where applicable)
 - Inventory information (*CLEI*^{*} code, date of manufacture, etc.)
 - *UL*[†] recognized.
-

Physical characteristics

The circuit packs have the following common physical characteristics:

- A unique keying design to prevent erroneous insertion in the *FAST* shelf
 - A standard labeling and bar code identification
 - Appearance coordinated with other Lucent Technologies *AnyMedia* products.
-

* *CLEI* is a trademark of Telcordia Technologies, Inc.

† *UL* is a registered trademark of Underwriters Laboratories, Inc.

AnyMedia Access System Apparatus Codes

Overview

The circuit packs supported at the *FAST* shelf when fully equipped with IAT Servers are listed below. Each circuit pack has a function code and an apparatus code. The complete list of circuit packs supported at the *FAST* shelf is in the AnyMedia® Access System, *Applications, Planning, and Ordering Guide*. When ordering a pack, consult the AnyMedia® Access System, *Ordering Guide* for the correct apparatus code.

Function Code	Apparatus Code
IODS1	FAC100
COMDAC	COM101, COM102
CTU	DTP101, DTP102, DTP103
IATS2	LPS100
IATS4	LPS104
IATS5	LPS105

Circuit Pack—IODS1 FAC100

Overview

The IODS1 FAC100 circuit pack provides the *AnyMedia* Access System with four independent DSX-1 cross-connect-compatible electrical interfaces. The IODS1 FAC100 supports a variety of framing formats and ones-density assurance techniques, supports robbed-bit signaling and facility data links, and monitors for facility errors and alarms.

For a detailed description of the IODS1 FAC100 circuit pack, see the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*.

Circuit Packs—COMDAC COM101, COMDAC COM102

Overview

The COMDAC COM101 and the COMDAC COM102 provide the central control and transmission fabric for the *AnyMedia* Access System. The COMDAC COM102 is a large line size version of the COMDAC COM101.

The COMDAC COM101 and the COMDAC COM102 hardware support multiple system applications, including GR-303, TR-08*, and INA. Both COMDACs support a variety of interchangeable telephony APs and the MDSU. The COMDAC COM101 supports the IATS2 Server. The COMDAC COM102 supports all of the IAT Servers (IATS2, IATS4, and IATS5).

For a detailed description of the COMDAC COM101 and COMDAC COM102 circuit packs, see the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*.

* TR-08 is not supported for IAT applications.

Circuit Packs—CTU DTP101, CTU DTP102, CTU DTP103

Overview

The following table provides an overview of the functions supported by the *AnyMedia* Access System CTU DTP101, CTU DTP102, and CTU DTP103 circuit packs.

Table 4-1. Overview of Functions Supported by the CTU DTP101, DTP102, and DTP103 Circuit Packs

Circuit Pack	Supported Functions
DTP101	• Operations-related functions, such as TR-08^a and GR-303 channel and drop testing and local metallic test access • Interfaces to external systems, such as the following: — RTU — CIT port for a GSI or TL1SI — 10BaseT LAN.
DTP102	• Same functions and interfaces as the DTP101 • Local digital test access and digital data service testing.
DTP103	• Same functions and interfaces as the DTP101 • Time domain reflectometry (TDR) testing

^aTR-08 is not supported for IAT applications.

For a detailed description of the CTU DTP101, CTU DTP102, and CTU DTP103 circuit packs, see the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*.

Circuit Pack—IATS2 LPS100

Overview

The IATS2 LPS100 operates in CO, RT, and customer premises environments. It may not be used in outside plant cabinets.

The IATS2 LPS100 plugs into any of the 16 AP slots of an *AnyMedia FAST* shelf and provides the interface functions between the IAT and the *AnyMedia RT*. An IATS2 LPS100 provides two DS1 interfaces, each of which supports 24 DS0 channels for switched voice, nonswitched voice, or digital data services.

A *FAST* shelf fully equipped with 16 IATS2 LPS100s supports 768 customer lines. The actual number of customer lines served depends on the mix of GR-303 and INA VRTs supported on the *AnyMedia RT*.

A functional block diagram of the IATS2 LPS100 is shown in Figure 4-3 on page 4-12, the faceplate is shown in Figure 4-4 on page 4-13, and Table 4-1 on page 4-14 lists the functions and colors of the LED indicators.

Provisionable parameters are described in *Configuration Management—DS1 IAT Server Port Provisioning* on page 5-17.

Features and functions

The IATS2 LPS100 supports the following features and functions:

Two DS1 line interfaces

- Supports an AMI bipolar interface and provisionable B8ZS coding
- Provides transmit pulse shaping with provisionable equalization
- Supports receive pulse regeneration and clock recovery
- Monitors pulse density and signal level for loss of signal
- Supports AIS transmission
- Monitors bipolar violations
- Provides DS1 bank loopbacks.

DS1 framing, robbed-bit signaling, and data link

- Supports ESF framing plus D4 framing
- Supports per-channel robbed-bit signaling and per-channel zero byte substitution (ZBS)
- Provides transmit and receive elastic stores for rate conversion and controlled slips
- Supports the ESF facility data link (HDLC messages, bit-oriented codes, and idle)
- Sources and monitors AIS and yellow facility alarms

- Monitors for framing bit errors and CRC-6 errors.

Data flow management and signaling

- Provides PCM channel and signaling mappings between the framers and the COMDACs
- Provides signaling translation between the IAT and the *FAST* shelf
- Detects and reports on-hook and off-hook signaling states
- Supports per-channel signaling freeze and per-channel trunk processing
- Supports simplex and duplex COMDAC operation and COMDAC side switches.

Synchronization and clock distribution

- Synchronizes to the reference clock coming from the active COMDAC
- Provides a local clock source for AIS transmission in the event there is no reference clock from the active COMDAC
- Generates and distributes clocks to the data flow router and concentrator, framers, and line interfaces.

IATS control

- Provisions the line interfaces, framers, time slot interchanger, and signaling translator (including the signaling translation maps)
 - Supports peripheral communications with the active COMDAC
 - Translates HDLC messages to and from AIU-compatible UART messages for the active COMDAC
 - Monitors and controls facility alarms (e.g., AIS and yellow alarms)
 - Controls loopbacks
 - Controls IATS built-in self-test (BIST)
 - Supports enhanced inventory
 - Supports performance monitoring of the upstream line interfaces from the IAT.
-

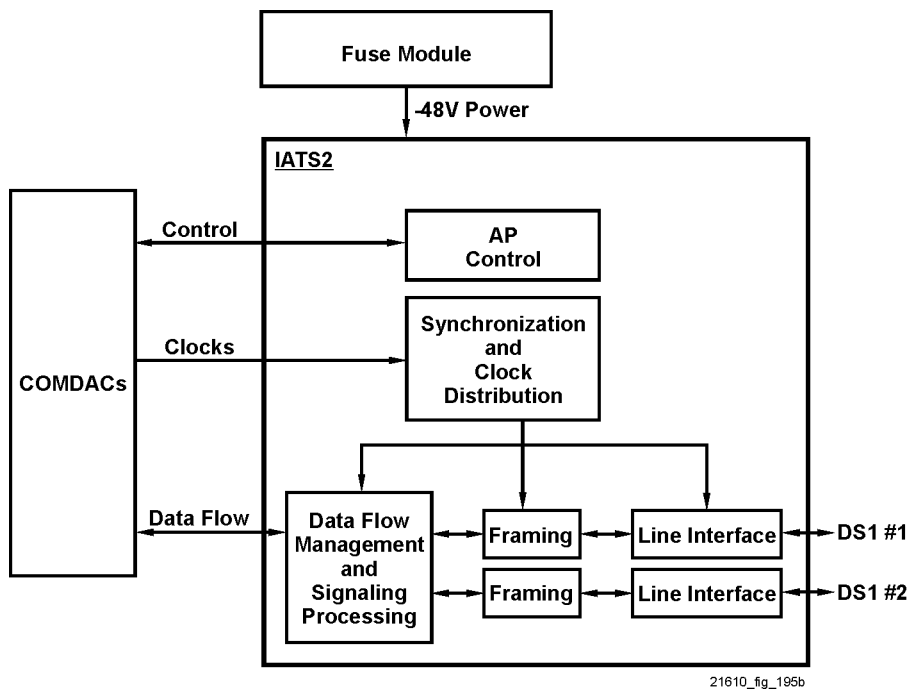
**Functional block
diagram**

Figure 4-3. IATS2 LPS100 Functional Block Diagram

**Equipment
description**

Circuit pack faceplate

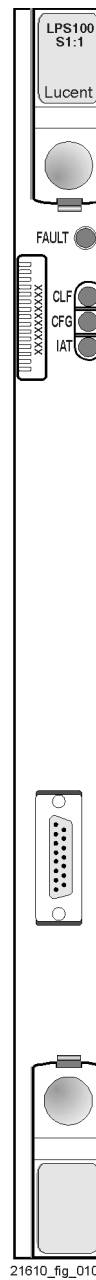


Figure 4-4. IATS2 LPS100 Faceplate

Circuit pack LED indicators**Table 4-1.** IATS2 LPS100 Faceplate LEDs

LED	Function	Color
FAULT	Lit when an internal IATS2 LPS100 failure is detected or when the circuit pack fails to initialize.	Red
CLF	Lit when a failure of either IAT/RT carrier link from the IAT to the IATS2 LPS100 is detected.	Yellow
CFG	Lit when a configuration error or a mismatch is detected, as follows: • The IATS2 LPS100 is placed in an AP slot not provisioned for the IAT Server type. • The IATS2 LPS100 faceplate DS1 cable is disconnected. • There is a mismatch between the host T0 provisioning and the IAT phantom CU equipage (IAT01 only).	Yellow
IAT	Lit when a failure of either line from the IATS2 LPS100 to the IAT (IAT/RT link working) is detected.	Yellow

Circuit Pack—IATS4 LPS104

Overview

The IATS4 LPS104 operates in CO, RT, and customer premises environments. It may not be used in outside plant cabinets.

The IATS4 LPS104 plugs into any of the 16 AP slots of an *AnyMedia* FAST shelf and provides the interface functions between the IAT and the *AnyMedia* RT. An IATS4 LPS104 provides 4 HDSL2 interfaces, each of which transports a payload of 24 DS0 channels for switched voice, nonswitched voice, or digital data services.

The IATS4 LPS104 uses the standard VF cable, which is used for most of the *AnyMedia* APs. Even though this VF cable contains 32 pairs, only pairs 1, 3, 5, and 7 are used for the HDSL2 interfaces of the LPS104. The remaining 28 pairs are not used for the LPS104.

A FAST shelf fully equipped with 16 IATS4 LPS104s supports 1536 customer lines. The actual number of customer lines served depends on the mix of GR-303 and INA VRTs supported on the *AnyMedia* RT.

The IATS4 LPS104 requires a FAST shelf equipped with a COMDAC COM102; the IATS4 LPS104 will not operate with the COMDAC COM100 or the COMDAC COM101.

Figure 4-3 on page 4-12 shows a functional block diagram of the IATS4 LPS104, Figure 4-4 on page 4-13 shows the faceplate, and Table 4-1 on page 4-14 lists the functions and colors of the LED indicators.

Provisionable parameters are described in *Configuration Management—HDSL2 IAT Server Port Provisioning* on page 5-19.

Features and functions

The IATS4 LPS104 supports the following features and functions:

Four HDSL2 line interfaces

- Provides PAM, demodulation, echo cancellation, and signal shaping (conforms to overlapped PAM transmission with interlocking spectra [OPTIS] power spectral density template)
- Provides upstream and downstream HDSL2 frame mapping
- Provides forward error correction
- Provides clock generation and timing recover
- Supports local and remote digital loopback
- Supports access to the HDSL2 embedded operations (for host-to-host communications)

- Provides secondary lightning and power cross protection.

Test access to the HDSL2 tip/ring pairs

- Supports splitting, look-out test access to each of the HDSL2 interfaces, one at a time

DS1 framing, robbed-bit signaling, and data link

- Supports ESF framing and SF framing
- Supports per-channel robbed-bit signaling and per-channel zero byte substitution (ZBS)
- Provides transmit and receive elastic stores for rate conversion and controlled slips
- Supports the ESF facility data link (HDLC messages, bit-oriented codes, and idle)
- Sources and monitors AIS and yellow facility alarms
- Monitors for framing bit errors and CRC-6 errors.

Data flow management and signaling processing

- Provides PCM channel and signaling mappings between the framers and the COMDACs
- Provides signaling translation between the IAT and the *FAST* shelf
- Detects and reports on-hook and off-hook signaling states
- Supports per-channel signaling freeze and per-channel trunk processing
- Supports simplex and duplex COMDAC operation and COMDAC side switches.

Synchronization and clock distribution

- Synchronizes to the reference clock coming from the active COMDAC
- Provides a local clock source for AIS transmission in the event there is no reference clock from the active COMDAC
- Generates and distributes clocks to the data flow router and concentrator, framers, and line interfaces.

IATS control

- Provisions the line interfaces, framers, time slot interchanger, and signaling translator (including the signaling translation maps)
- Supports peripheral communications with the active COMDAC
- Translates HDLC messages to and from AIU-compatible UART messages for the active COMDAC
- Monitors and controls facility alarms (e.g., AIS and yellow alarms)
- Controls loopbacks

- Controls IATS built-in self-test (BIST)
- Supports enhanced inventory
- Supports performance monitoring of the HDSL2 line interfaces and the DS1 payloads from the IAT.

Functional block diagram

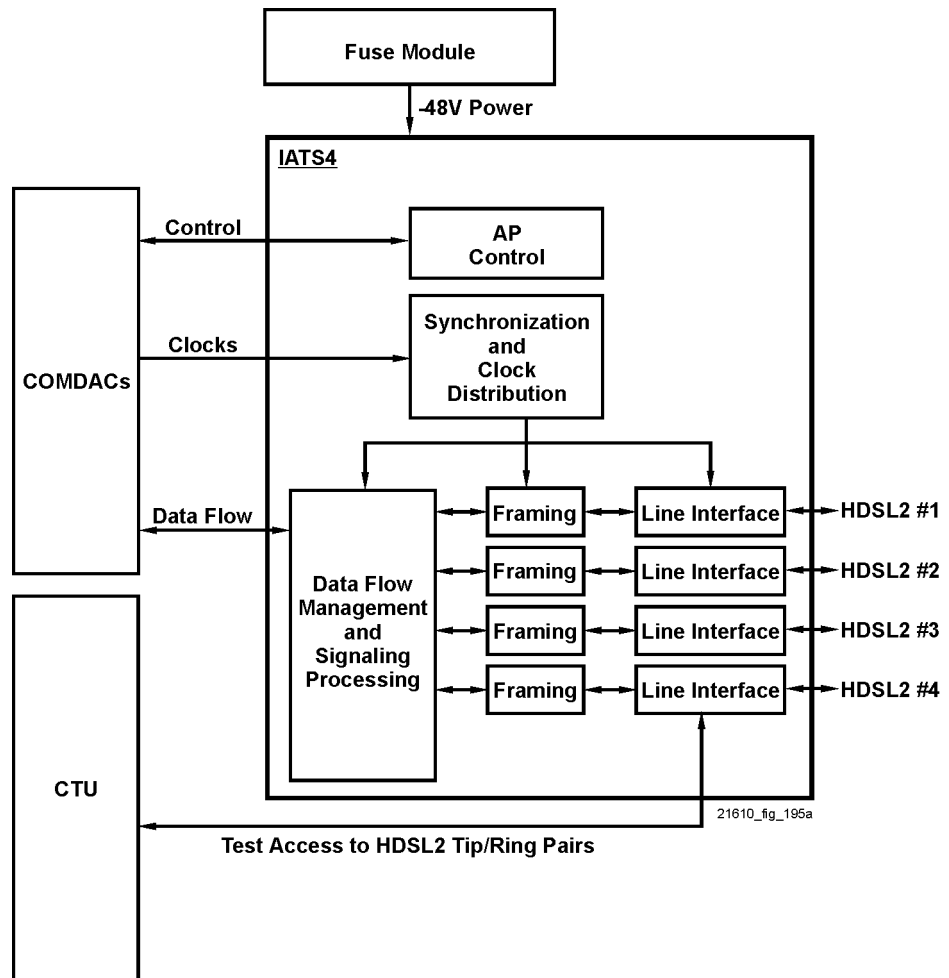
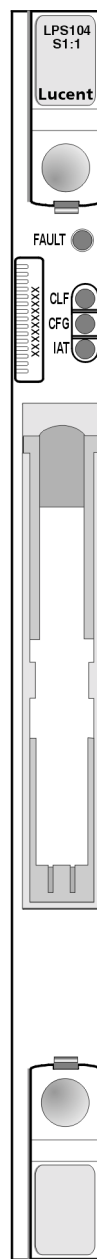


Figure 4-5. IATS4 LPS104 Functional Block Diagram

**Equipment
description****Circuit pack faceplate**

21610_fig_010e

Figure 4-6. IATS4 LPS104 Faceplate

Circuit pack LED indicators

Table 4-1. IATS4 LPS104 Faceplate LEDs

LED	Function	Color
FAULT	Lit when an internal IATS4 LPS104 failure is detected or when the circuit pack fails to initialize	Red
CLF	Lit when a failure of one or more IAT/RT carrier links from the IAT to the IATS4 LPS104 is detected.	Yellow
CFG	Lit when a configuration error or a mismatch is detected, as follows: • The IATS4 LPS104 is placed in an AP slot not provisioned for the IAT Server type. • The IATS4 LPS104 faceplate HDSL2 cable is disconnected. • There is a mismatch between the host T0 provisioning and the IAT phantom CU equipage (IAT01 only).	Yellow
IAT	Lit when a failure of one or more lines from the IATS4 LPS104 to the IAT (IAT/RT link working) is detected.	Yellow

Circuit Pack—IATS5 LPS105

Overview

The IATS5 LPS105 operates in CO, RT, and customer premises environments. It may not be used in outside plant cabinets.

The IATS5 LPS105 plugs into any of the 16 AP slots of an *AnyMedia FAST* shelf and provides the interface functions between the IAT and the *AnyMedia RT*. An IATS5 LPS105 provides five DS1 interfaces, each of which supports 24 DS0 channels for switched voice, nonswitched voice, or digital data services.

A *FAST* shelf fully equipped with 16 IATS5 LPS105 APs supports 1920 customer lines. The actual number of customer lines served depends on the mix of GR-303 and INA VRTs supported on the *AnyMedia RT*.

The IATS5 LPS105 requires a *FAST* shelf equipped with the COMDAC COM102; the IATS5 LPS105 will not operate with the COMDAC COM100 or the COMDAC COM101.

Figure 4-3 on page 4-12 shows a functional block diagram of the IATS5 LPS105, Figure 4-4 on page 4-13 show the faceplate, and Table 4-1 on page 4-14 lists the functions and colors of the LED indicators.

Provisionable parameters are described in *Configuration Management—DS1 IAT Server Port Provisioning* on page 5-17.

Features and functions

The IATS5 LPS105 supports the following features and functions:

Five DS1 line interfaces

- Supports an AMI bipolar interface and provisionable B8ZS coding
- Provides transmit pulse shaping with provisionable equalization
- Supports receive pulse regeneration and clock recovery
- Monitors pulse density and signal level for loss of signal
- Sources AIS transmission
- Monitors for bipolar violations
- Provides DS1 line loopbacks and bank loopbacks.

DS1 framing, robbed-bit signaling, and data link

- Supports ESF framing and SF framing
- Supports per-channel robbed-bit signaling and per-channel zero byte substitution (ZBS)
- Provides transmit and receive elastic stores for rate conversion and controlled slips

- Supports the ESF facility data link (HDLC messages, bit-oriented codes, and idle)
- Sources and monitors AIS and yellow facility alarms
- Monitors for framing bit errors and CRC-6 errors.

Data flow management and signaling processing

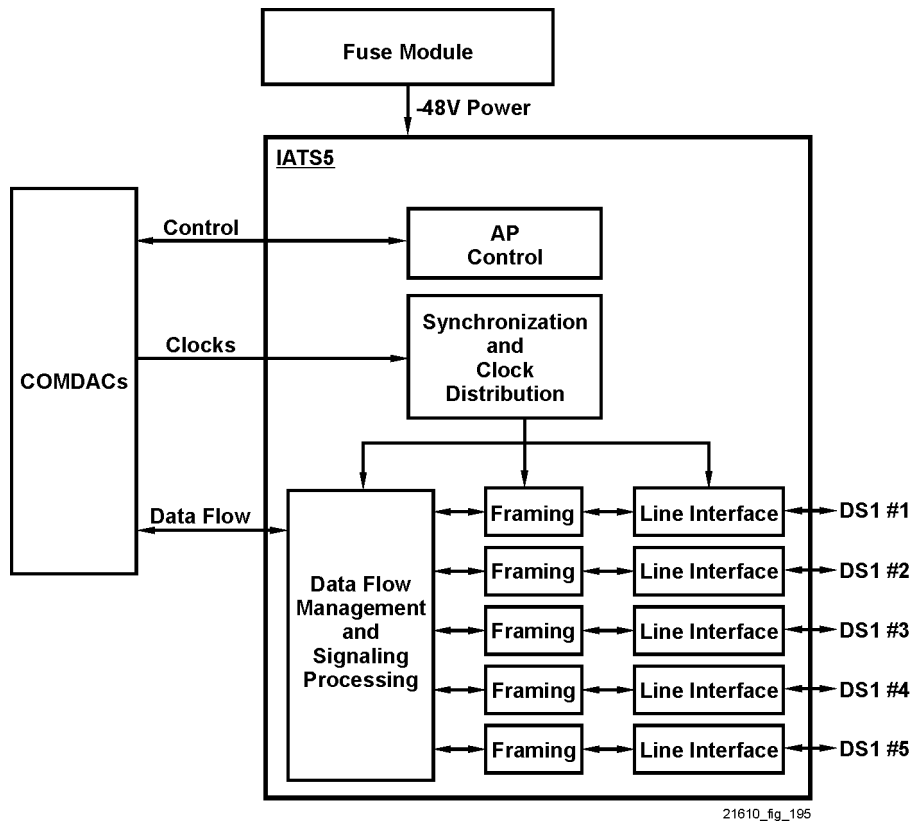
- Provides PCM channel and signaling mappings between the framers and the COMDACs
- Provides signaling translation between the IAT and the *FAST* shelf
- Detects and reports on-hook and off-hook signaling states
- Supports per-channel signaling freeze and per-channel trunk processing
- Supports simplex and duplex COMDAC operation and COMDAC side switches.

Synchronization and clock distribution

- Synchronizes to the reference clock coming from the active COMDAC
- Provides a local clock source for AIS transmission in the event there is no reference clock from the active COMDAC
- Generates and distributes clocks to the data flow router and concentrator, framers, and line interfaces.

IATS control

- Provisions the line interfaces, framers, time slot interchanger, and signaling translator (including the signaling translation maps)
 - Supports peripheral communications with the active COMDAC
 - Translates HDLC messages to and from AIU-compatible UART messages for the active COMDAC
 - Monitors and controls facility alarms (e.g., AIS and yellow alarms)
 - Controls loopbacks
 - Controls IATS built-in self-test (BIST)
 - Supports enhanced inventory
 - Supports performance monitoring of the upstream DS1 line interfaces from the IAT.
-

**Functional block
diagram****Figure 4-7.** IATS5 LPS105 Functional Block Diagram

**Equipment
description**

Circuit pack faceplate



21610_fig_010dd

Figure 4-8. IATS5 LPS105 Faceplate

Circuit pack LED indicators**Table 4-1.** IATS5 LPS105 Faceplate LEDs

LED	Function	Color
FAULT	Lit when an internal IATS5 LPS105 failure is detected or when the circuit pack fails to initialize.	Red
CLF	Lit when a failure of one or more IAT/RT carrier links from the IAT to the IATS5 LPS105 is detected.	Yellow
CFG	Lit when a configuration error or a mismatch is detected, as follows: • The IATS5 LPS105 is placed in an AP slot not provisioned for the IAT Server type. • The IATS5 LPS105 faceplate DS1 cable is disconnected. • There is a mismatch between the host T0 provisioning and the IAT phantom CU equipage (IAT01 only).	Yellow
IAT	Lit when a failure of one or more lines from the IATS5 LPS105 to the IAT (IAT/RT link working) is detected.	Yellow

Overview

This chapter describes the OAM&P operations of the *AnyMedia* Access System for IAT services.

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OAM&P Interface

Overview

The GSI of the *AnyMedia* Management Interface supports the operations that manage the *AnyMedia* Access System functional areas for OAM&P operations via TL1 command execution.

For more details, refer to *Management Interface* in Chapter 6, *Traditional DLC Interfaces*, of the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*.

Configuration Management

Overview

Configuration Management is the system activity for operations that control and provision the system, including the following:

- Memory administration—Used to manage the nonvolatile data storage (NVDS) of the *AnyMedia* Access System
 - Software management—Used to manage the nonvolatile program storage (NVPS) of the *AnyMedia* Access System
 - Service provisioning—Process of preparing a port circuit for service by defining the function of the port circuit and setting its parameters
 - VFDE/*ClearReach* feature—Improved modem performance may be achieved on certain locally switched GR-303 calls when the VFDE feature is enabled on the *AnyMedia* Access System, the *ClearReach* feature is enabled on the *ConnectReach* Terminal or *ConnectReach* 200, and the *AnyMedia* Access System is hosted by a 5ESS switch with VFDE enabled
 - Inventory management—System activity of collecting, updating, and reporting data on system equipage and system status
 - Synchronization provisioning—Controls the synchronization mode of the *AnyMedia* Access System and its synchronization reference sources
 - Facility data link—Opens a channel to communicate to the IAT01 (*ConnectReach* Terminal and *ConnectReach* 200) via the data link on the DS1 or HDSL2 facility between the *FAST* shelf and the IAT.
-

Configuration Management—Memory Administration

Overview

Memory administration is used to manage the NVDS of the *AnyMedia* Access System. NVDS contains the host terminal provisioning data including slot provisioning, logical subshelf provisioning, line termination provisioning, T0 provisioning, and IAT Server port provisioning.

Data storage

The system has the following types of data storage:

- Volatile data storage, which is in the RAM
- NVDS, which is implemented using a FLASH memory device on the COMDAC circuit pack.

The system periodically audits the NVDS. If the system is in a simplex configuration, it checks the self-consistency of the NVDS. If the system is in a duplex configuration, it checks self-consistency and mutual-consistency of both copies of the NVDS.

Configuration Management—Software Management

Overview

Software management is used to manage the NVPS of the *AnyMedia* Access System. NVPS is the nonvolatile memory on the COMDAC and the AFM used to store the program image.

For more details, refer to the AnyMedia® Access System, *Applications, Planning, and Ordering Guide*.

Configuration Management—Service Activation

Overview

Service activation is the process of preparing the *AnyMedia* Access System for service by configuring the cross-connections between its bandwidth management entities (e.g., feeder resources, VRTs, and VBs) and setting any required options.

For more details, refer to the AnyMedia® Access System, *Applications, Planning, and Ordering Guide*.

Configuration Management— Provisioning

Overview

The following provisioning functions for the *AnyMedia* Access System are described in this section:

- Slot provisioning
 - Logical subshelf provisioning
 - Line termination provisioning
 - T0 provisioning
 - DS1 IAT Server port provisioning
 - HDSL2 IAT Server port provisioning.
-

Configuration Management—Slot Provisioning

Overview

Slot provisioning is the process of preparing a slot in the *FAST* shelf to work with a certain type of AP. This section covers slot provisioning for an IAT Server.

Slot provisioning

The IAT Server is an AP that provides two distribution DS1 ports. A total of 16 IAT Servers may be installed in a *FAST* shelf, serving up to 80 IATs. Each slot in the *FAST* shelf that is to be equipped with an IAT Server must be provisioned using the ENT -PACK TL1 command, with pack type=IATSVR. The provisioning of a slot may be verified using the RTRV -PACK TL1 command. The provisioning of a slot may be deleted with the DLT -PACK TL1 command.

Configuration Management—Logical Subshelf Provisioning

Overview

An IAT is considered a subshelf of the *AnyMedia* Access System. Logical subshelf provisioning includes assigning a logical subshelf number and identifying the subshelf type to the *AnyMedia* Access System. Also included is the logical subshelf to physical IAT Server port association.

Logical subshelf provisioning

Each IAT connected to a particular *FAST* shelf must be assigned a logical subshelf number in the *AnyMedia* Access System, and the logical subshelf number must be associated with a physical IAT Server port.

The type of IAT must also be identified to the *AnyMedia* Access System when the logical subshelf number is assigned. Two types of IATs are supported by the *AnyMedia* Access System—IAT01 and IAT02. The subshelf type IAT01 refers to the proprietary (modified D4) type used by both the *ConnectReach* Terminal and *ConnectReach* 200. The subshelf type IAT02 refers to the industry standard (nonproprietary) D4 type of IAT.

The ENT-SUBSHELF TL1 command is used to assign the logical subshelf number and identify the subshelf type of the IAT to the *AnyMedia* Access System. The RTRV-SUBSHELF TL1 command is used to verify the subshelf provisioning, and the DLT-SUBSHELF TL1 command may be used to delete the logical subshelf provisioning.

Logical to physical provisioning

The logical subshelf also must be associated with a physical IAT Server port via the ENT-CRS-SUBSHELF TL1 command. The logical subshelf association with a physical IAT Server port is verified with the RTRV-CRS-SUBSHELF TL1 command and may be deleted with the DLT-CRS-SUBSHELF TL1 command.

Configuration Management—Line Termination Provisioning

Overview

Line termination provisioning is the process of preparing a subscriber line for service by defining its function and setting any required options. This section deals with IAT specific provisioning.

Service provisioning considerations

IAT services include traditional message telephone service (POTS and locally switched special services) and Nx64 (N timeslots of 64 kbps each) digital data service. These services are supported via an IAT at the customer premises and an IAT Server in the *FAST* shelf. The IAT Server contains no physical option switches; instead, its function is controlled by electronic service provisioning information that is stored in NVDS in the *AnyMedia* Access System. Software in the *AnyMedia* Access System compares this stored service provisioning information with the *ConnectReach* Terminal or *ConnectReach* 200 equipage and, if they are compatible, the software conditions the hardware to provide the desired service.

The following significant pieces of information are required to provision service on any interface:

- The physical subscriber line must be assigned to a logical line on an in-service VRT or to a logical DS0 on an INA VB. This assignment is represented by a T0 cross-connection.
- Transmission and signaling parameters for the desired service must be provided. The information is represented by a T0 provisioning record. For lines served by a GR-303 VRT, the information can be entered via a TL1 command from an OS, a TL1SI, or the GSI. Alternatively, a compatible CO switch can provide the necessary information via its GR-303 EOC. The Lucent 5ESS[®], switch, the Nortel *DMS-100* switch, and the Siemens *EWSD* support either EOC or OS provisioning.

The *AnyMedia* Access System associates the transmission and signaling parameters (the T0 records) with the *logical* lines of the system. The logical line-to-physical port assignment information (the T0 cross-connections) permits the system software to transfer these parameters to the correct hardware port.

Note that IAT lines cannot be cross-connected to TR-08 VRTs.

Physical-to-logical port provisioning

To establish service on a subscriber line of the *AnyMedia* Access System, the physical subscriber line to an IAT must be assigned to a logical line on a VRT or INA VB within the system. The *AnyMedia* Access System may contain up to 3 GR-303 VRTs, and/or up to 20 INA VBs, subject to the limit imposed by the 20 available DS1 network interfaces. A physical subscriber line may be assigned to

only 1 logical line on 1 VRT or INA VB; similarly, a logical line can be assigned to only 1 physical subscriber line.

A GR-303 VRT can support any number of IAT lines up to the full 1920-line maximum capacity of the fully populated *FAST* shelf. The logical lines of each GR-303 VRT are identified by CRVs, which may be any of 1920 integer values from 1 to 2048. A physical subscriber line in the system can be assigned to any CRV of a GR-303 VRT.

An INA VB supports 24 logical DS0 timeslots and a maximum of 24 physical lines. The logical DS0 timeslots are numbered from 1 to 24. A physical subscriber line may be assigned to any logical DS0 within any INA VB.

The association between logical lines and physical lines can be changed by deleting a cross-connection and entering a new cross-connection. This permits the physical appearance of a logical line to be easily moved from one physical port to another physical port without changing the serving switch's database.

Transmission and signaling parameter provisioning

Transmission and signaling information must be provided for each subscriber line prior to service availability (i.e., the *AnyMedia* Access System provides no default provisioning).

The per-line provisioning information may be entered via TL1 commands from a remote OS, a TL1SI, or the GSI. Alternatively, the information for POTS/SPOTS® and DID applications can be provisioned via the GR-303 EOC by digital switches that implement this functionality. The TL1 and EOC interfaces act on a single instance of the *AnyMedia* Access System's nonvolatile data store so that absolute provisioning information integrity is maintained within the system, regardless of the source of a provisioning data change. Changes to the provisioning information made via the GR-303 EOC may be viewed via the TL1 interface, and vice versa. However, not all provisioning features are available via the EOC interface. The choice of TL1 versus EOC provisioning for GR-303 applications, or some hybrid of the two provisioning types, will be dictated by the operations plan of the local exchange carrier and by the capabilities of the LDS.

The TL1 provisioning information is aligned with Telcordia Technologies, Inc. GR-199. The per-subscriber information consists of a *CLEI* code, a generic signaling function (GSFN) code which specifies the circuit's signaling protocol, and a variable number of additional parameters specific to each GSFN code.

The *CLEI* code information is not required to provide service. The field may be used if desired to indicate the intended AP type for a service. However, the system software will not deny service to a subscriber line because the provisioned *CLEI* code does not match the equipped *CLEI* code of an AP. The *CLEI* field may remain empty without affecting the service capability of a subscriber line. For IAT services, the *CLEI* code is not used.

The GSFN codes supported in the *AnyMedia* Access System for the IAT feature are as follows:

- DFLT—default POTS/*SPOTS*
- 2LS—loop start
- 2GS—ground start
- 2RVT—direct inward dialing/dial pulse terminate (DID/DPT)
- FXOD—foreign exchange office
- NO—transmission only
- FXS0—foreign exchange station
- EM0—E&M
- OCU0—64 kbps clear channel data and multiple channels of 64 kbps data (Nx64).

Additional transmission and signaling parameters may be required depending upon the GSFN code of the circuit being provisioned.

For IAT01 (*ConnectReach* Terminal and *ConnectReach* 200), the system software compares the transmission and signaling information for each logical line with the associated IAT hardware. If the hardware is compatible with the provisioned GSFN code and the associated parameters, then the appropriate information is transferred to the hardware registers and the line is placed in service.

For lines served on an IAT02, the local service state of the line is in service if the IAT Server is installed, the IAT Server is correctly provisioned, and the DS1 to the IAT is operational. Proper equipage and provisioning at the IAT02 is required for services to work, but these are not verified by the *AnyMedia* Access System.

Provisioning service activation

Service activation for IAT services requires that feeder and subscriber lines be associated with a VRT/VB through T1 and T0 cross-connections, respectively, and that T0 provisioning data be entered for the desired service. Finally, the required physical circuit packs must be equipped. Figure 5-1 on page 5-13 represents the composite provisioning data required to bring a single subscriber line into service on a GR-303 VRT, with examples of the associated TL1 commands. Note that slot provisioning, logical subshelf provisioning, and association of a logical subshelf with a physical IAT Server port are not shown in this figure.

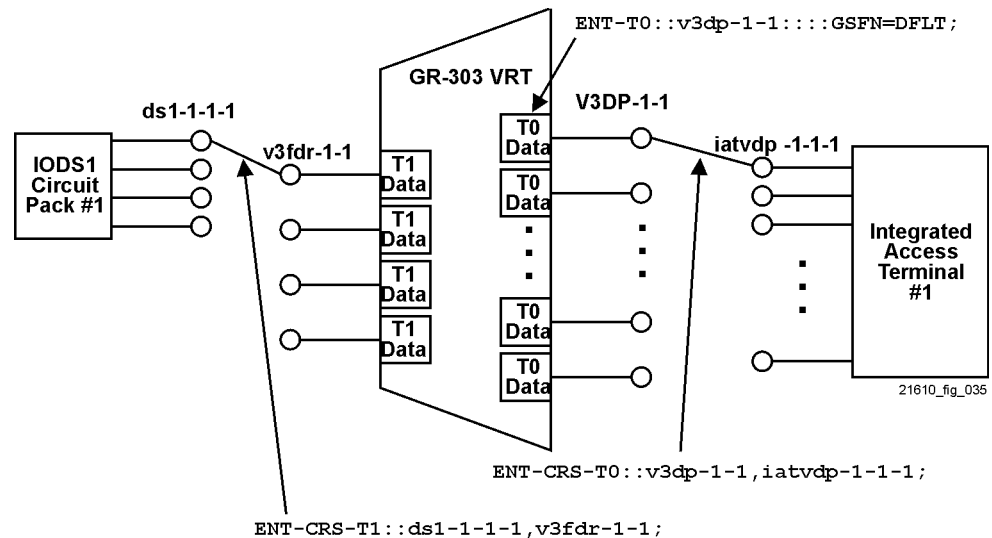


Figure 5-1. Provisioning Data for a GR-303 POTS Subscriber Line

A GR-303 VRT supports DS0 concentration (i.e., it can support more physical subscriber lines than trunk timeslots). The subscriber lines will be dynamically assigned to available trunk timeslots as required, under control of the GR-303 switch.

The *AnyMedia* Access System imposes few restrictions on line termination provisioning. Therefore, it is possible to define some unusual combinations of VRTs/VBs and services (e.g., a coin line may be provisioned in an INA VB, although such a configuration may have no practical application).

The *AnyMedia* Access System has limited provisioning memory capacity that can accommodate provisioning records for up to 2048 subscriber lines. This is greater than the maximum number of physical lines that can be supported by the system. This permits two provisioning records to be created for a limited number of lines during load balancing or service rollover operations.

The T0 records for retired lines should always be deleted so that the provisioning resources of the *AnyMedia* Access System will not be exhausted.

Configuration Management—T0 Provisioning

Overview

The logical lines of VRTs/VBs in the *AnyMedia* Access System must be provisioned with appropriate T0 data to activate subscriber service. The system provides no default T0 provisioning data.

The T0 data are stored in nonvolatile data memory on the COMDAC circuit pack and transferred to the associated IAT Server as needed. The T0 data can be managed via the ENT - T0, ED - T0, RTRV - T0, and DLT - T0 TL1 commands. Alternatively, for the GR-303 VRT, the data can be managed by the GR-303 LDS via its EOC. The TL1 and EOC interfaces act on the same nonvolatile data memory, so that consistent data are maintained regardless which interface performs the provisioning. The current memory contents can be retrieved by either interface.

IAT Server replacement

When an IAT Server is replaced with an identical IAT Server, the new IAT Server will be provisioned automatically with the current T0 data.

T0 parameters

The T0 data for a logical line defines the service function of the associated subscriber line. The key parameter in the T0 record is the GSFN.

The GSFN codes available via the IAT feature are as follows:

- DFLT—is applicable to both IAT01 and IAT02. Lines that are provisioned with the DFLT GSFN provide POTS/SPOTS service. These lines can be created from the GR-303 LDS or via the TL1 commands.
- 2LS—is applicable to both IAT01 and IAT02. Lines that are provisioned with the 2LS GSFN provide loop start service. These lines can be created from the GR-303 LDS or via the TL1 commands.
- 2GS—is applicable to both IAT01 and IAT02. Lines that are provisioned with the 2GS GSFN provide ground start service. These lines can be created from the GR-303 LDS or via the TL1 commands.
- 2RVT—is applicable to both IAT01 and IAT02. Lines that are provisioned with the 2RVT GSFN provide two-wire DID service, with either dial pulse or multifrequency addressing. These lines can be created from the GR-303 LDS or via the TL1 commands.
- FXOD—is applicable to IAT02. Lines that are provisioned with the FXOD GSFN provide foreign exchange—office end, loop-start or ground-start signaling, with normal or reversed signaling leads, and with or without toll diversion. These lines can be created via the TL1 commands.

- NO—is applicable to IAT02. Lines that are provisioned with the NO GSFN provide private line transmission-only service. The NO function is used for private lines (voice or data). These lines can be created via the TL1 commands.
- FXS0—is applicable to both IAT01 and IAT02. Lines that are provisioned with the FXS0 GSFN provide foreign exchange—subscriber end, loop-start or ground-start signaling, with normal or reversed signaling leads, and with or without toll diversion. These lines can be created via the TL1 commands.
- EM0—is applicable to IAT02. Lines that are provisioned with the EM0 GSFN provide E&M signaling, Type 1 or Type 2. Both Type I and II signaling connections are supported. These lines can be created via the TL1 commands.
- OCU0—is applicable to both IAT01 and IAT02. Lines that are provisioned with the OCU0 GSFN provide private line data service. The rate is 64 kbps. These lines can be created via the TL1 commands. Nx64 services are provided by using multiple sequential DS0s, all provisioned with the OCU0 GSFN.

Depending on the GSFN code selected for a T0 record, a number of additional parameters can be provisioned for the affected subscriber line. These parameters are summarized in Figure 5-2 on page 5-16. Default values are provided for all parameters.

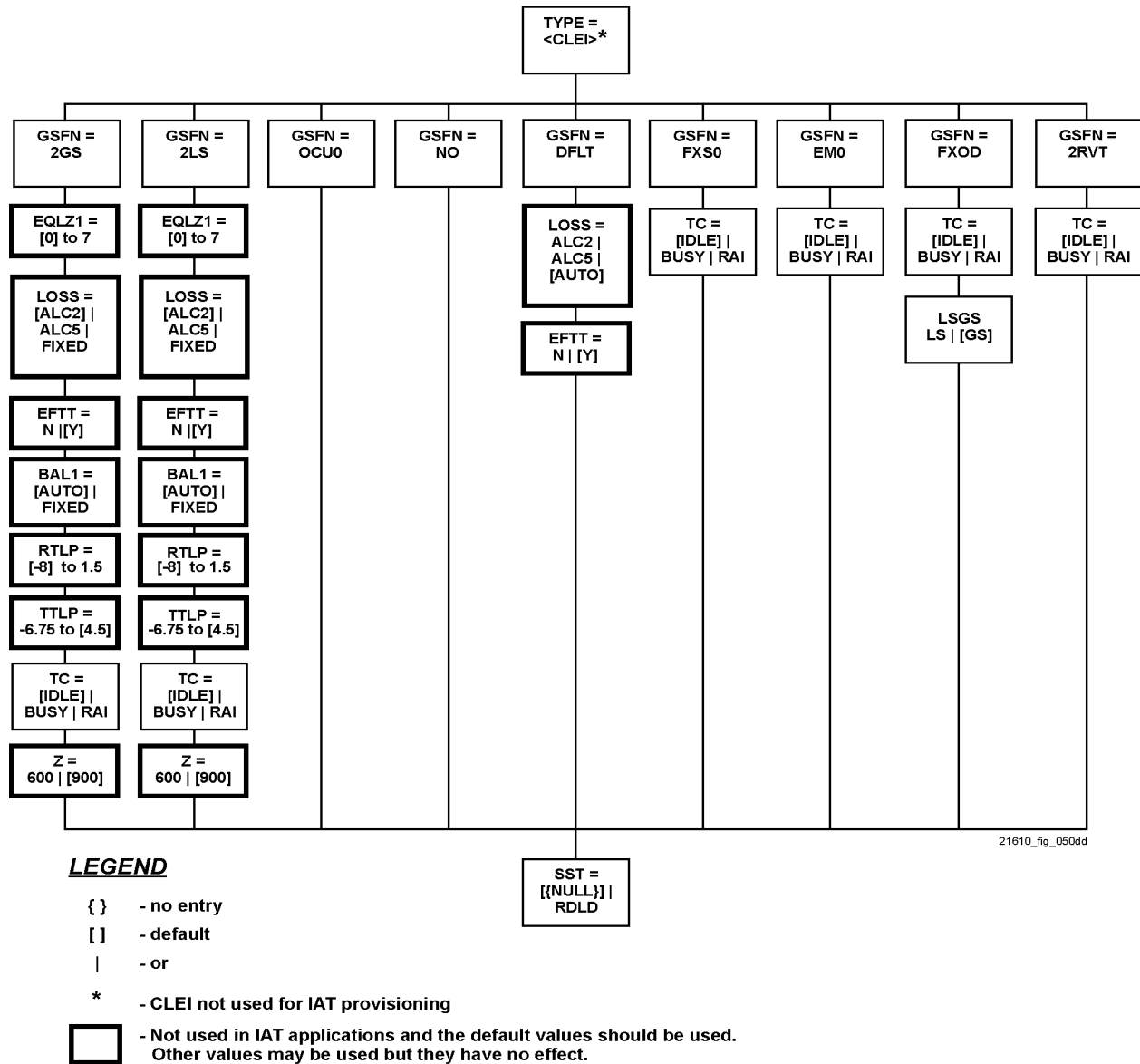


Figure 5-2. TL1 Provisioning Parameters for T0 Objects—IAT

Configuration Management—DS1 IAT Server Port Provisioning

Overview

The DS1 IAT Server ports in the *AnyMedia FAST* shelf terminate the distribution DS1s from IATs. The IAT Server supports a DS1 interface as specified in T1.102-1993. This DS1 interface is intended to be used as an intrasite or intraoffice interconnect. The DS1 interface supports a limited transmission distance from the *FAST* shelf to the DSX-1 cross connect panel depending on the type of cable used, up to 655 feet for 22-gauge wire.

Line code

The AMI line code is supported by the DS1 interface. AMI is a binary signal in which no pulse indicates a binary 0, and a pulse with polarity opposite to the previous pulse indicates a 1. AMI is also called a bipolar signal. The *ones* density assurance techniques supported by the line code include the following:

- B8ZS
- ZCS.

These techniques may be provisioned individually for each distribution DS1 via a TL1 command.

B8ZS

The B8ZS technique replaces any sequence of eight consecutive zeros with a code to represent the eight zero bits. B8ZS is the default technique and will ensure a sufficient *ones* density in the DS1 signal without affecting the payload. The B8ZS technique is required for IAT01 interfaces.

ZCS

ZCS may be required for some IAT02 DS1 signals. When a DS1 signal is provisioned for ZCS, the system employs a ZCS technique on the DS0 signals that carry VF services in that DS1. This ZCS technique replaces the seventh bit (second least significant bit) with a binary *one* in each DS0 that contains an all *zero* code.

Framing formats

The system supports two different DS1 frame formats:

- ESF
- SF (traditional D4 framing used for DS1 facilities).

The SF and ESF formats are defined in T1.107-1988. IAT01 DS1 signals must be provisioned with the ESF format. IAT02 DS1 signals may be provisioned for either the SF or ESF format.

Equalization

The equalization for DS1 interface may be provisioned to match the distance, in feet, from the IAT Server to the DSX-1 cross-connect. EQLZ may be provisioned with any value from 0 to 655.

Signal degrade threshold

The signal degrade threshold (DGTH) is the value that determines the performance monitoring threshold before an alert is sent to the operations support system. Values are 4 (bit error rate of 10^{-4}), 5 (10^{-5}), 6 (10^{-6}), and 7 (10^{-7}).

Configuration Management—HDSL2 IAT Server Port Provisioning

Overview

The HDSL2 IAT Server ports in the *AnyMedia FAST* shelf terminate the distribution HDSL2 facilities from IATs. The IAT Server supports the HDSL2 interface as specified in T1E1.4/99-006R4. HDSL2 provides full-duplex transmission of full 1.544 Mbps DS1 payload. The HDSL2 may be used in the outside plant. The HDSL2 interface supports a transmission distance from the *FAST* shelf to the IAT depending on the type of cable used, up to 12,000 feet of 24-gauge wire. If a 26-gauge cable is used, it may not exceed 9,000 feet.

The HDSL2 facility encapsulates a DS1 signal: all the DS1 provisioning parameters are therefore available with HDSL2. Although the EQLZ parameter is available and may be provisioned, it is ignored by the HDSL2 IAT Server, since it has no meaning for the HDSL2 interface.

Line code

The AMI line code is supported by the HDSL2 interface. AMI is a binary signal in which no pulse indicates a binary 0, and a pulse with polarity opposite to the previous pulse indicates a 1. AMI is also called a bipolar signal. The *ones* density assurance techniques supported by the line code include the following:

- B8ZS
- ZCS.

These techniques may be provisioned individually for each distribution HDSL2 interface via a TL1 command.

B8ZS

The B8ZS technique replaces any sequence of eight consecutive zeros with a code to represent the eight zero bits. B8ZS is the default technique and will ensure a sufficient *ones* density in the DS1 signal without affecting the payload. The B8ZS technique is required for IAT01 interfaces.

ZCS

ZCS may be required for some IAT02 DS1 signals. When a DS1 signal is provisioned for ZCS, the system employs a ZCS technique on the DS0 signals that carry VF services in that DS1. This ZCS technique replaces the seventh bit (second least significant bit) with a binary *one* in each DS0 that contains an all *zero* code.

Framing formats

The system supports two different DS1 frame formats:

- ESF
- SF (traditional D4 framing used for DS1 facilities).

The SF and ESF formats are defined in T1.107-1988. IAT01 DS1 signals must be provisioned with the ESF format. IAT02 DS1 signals may be provisioned for either the SF or ESF format.

Equalization

Equalization is ignored by the HDSL2 IAT Server.

Signal degrade threshold

The signal degrade threshold (DGTH) is the value that determines the performance monitoring threshold before an alert is sent to the operations support system. Values are 4 (bit error rate of 10^{-4}), 5 (10^{-5}), 6 (10^{-6}), and 7 (10^{-7}).

Configuration Management—VFDE/ *ClearReach* Feature

Overview	When the <i>ClearReach</i> feature is enabled in the <i>ConnectReach</i> Terminal or <i>ConnectReach</i> 200 and the VFDE feature is enabled in the <i>AnyMedia</i> Access System, robbed-bit signaling is suspended after calls are established, which yields improved 56k modem performance. The <i>ClearReach</i> feature and VFDE are applicable to locally switched loop start and ground start GR-303 calls when the <i>AnyMedia</i> Access System is hosted by a 5ESS switch.
5ESS switch	The <i>AnyMedia</i> Access System must be hosted via a GR-303 interface on a 5ESS switch. VFDE must be enabled in the 5ESS switch.
<i>AnyMedia</i> Access System	VFDE must be enabled in the <i>AnyMedia</i> GR-303 VRT using the ALW-VFDE TL1 command.
<i>ClearReach</i> feature	The <i>ClearReach</i> feature must be activated in the <i>ConnectReach</i> Terminal or <i>ConnectReach</i> 200.

Configuration Management—Inventory Management

Overview

Inventory Management is the system activity of collecting, updating, and reporting data on system equipage and system status (i.e., IS or OOS). Inventory Management includes reporting new equipment inventory upon installation, storing equipment status, removing equipment inventory upon degrowth, and reporting changes in inventory.

Retrieval inventory items

Electronically readable inventory in the system can be retrieved on demand.

Retrieval inventory items for the IAT Server and the IAT01 terminal include the following:

- TYPE—A mnemonic name that identifies the kind of equipment
- APP—The apparatus code that uniquely identifies the equipment function
- ICC—The interchangeability code stored in the form of $Sm-n$, where m is the issue number and n is the series number
- CLEI—A 10-character code that identifies each circuit pack type
- ECI—A 6-character code that identifies each circuit pack type; the equipment catalog item code corresponds to the bar coded label on the faceplate of the circuit pack and is uniquely equivalent to the CLEI
- SLN—A 12-character code that uniquely identifies each circuit pack; the serial number SLN includes the date and place of manufacture.

Primary and secondary service state information is also retrieval for the IAT Server and the IAT terminal as follows:

- Primary service state—The valid values are as follows:
 - IS—In service
 - OOS—Out of service.
- Secondary service state—The valid values are as follows:
 - FLT—Fault
 - INIT—Initialization including diagnostics.

No inventory information is retrieval from the IAT02 terminal at the *AnyMedia* Access System.

Physical data label

On the front of each circuit pack is an electronically scannable bar code and a human readable inventory data label. The human readable component contains

the *CLEI* code, apparatus code, entity type, and interchangeability code. The bar code scannable component of the label contains the equipment catalog item code.

**Reportable
database changes**

Autonomous notification is provided when changes occur to the inventory database as a result of the execution of provisioning commands, state changes, or changes in the physical inventory.

Configuration Management— Synchronization Provisioning

Overview

Synchronization provisioning controls the synchronization mode of the *AnyMedia* Access System and its synchronization reference sources.

Synchronization modes

The synchronization mode is selected by a TL1 command.

The *AnyMedia* Access System typically operates in the line-timed mode. In this mode, the system acquires its timing from a DS1 input signal. Two input signals can be specified as the timing reference sources. If the active source fails, the system automatically selects the duplicate source. When the system's nonvolatile data store is initialized at turn-up, the line-timed mode is selected as the initial default synchronization mode for the system.

The *AnyMedia* Access System may be synchronized to external clock signals from a building timing supply or from a SONET multiplexer. The system accepts either DS1 (1.544 MHz) or composite clock (8 kHz and 64 kHz) external clock signals. External clock signal inputs must be duplicated. The *AnyMedia* Access System automatically switches to the duplicate clock signal if the active signal fails.

The system can also operate in the free-running mode.

Switching between synchronization modes does not guarantee call preservation.

Line timing synchronization references

The line timing synchronization reference sources are also selected by TL1 provisioning.

The *AnyMedia* Access System supports two synchronization reference sources. When the system's nonvolatile data store is initialized at turn-up, the first DS1 inputs on each of the first two IODS1 circuit packs are selected as the initial default reference sources.

Configuration Management—Facility Data Link

Overview

The *AnyMedia* Access System operations interfaces (GSI, etc.) can open a channel to communicate to the IAT01 terminals (*ConnectReach* Terminals and *ConnectReach* 200) via the data link on the DS1 or HDSL2 facility between the *FAST* shelf and the IAT.

Using the facility data link

A communications channel from the *FAST* shelf to the IAT01 terminal may be established using the ACT - IAT TL1 command. The communications channel is provided via the data link on the DS1 facility to the IAT.

When the ACT - IAT command is executed, the TL1SI View window becomes the IATSI view. The user is then logged into the *ConnectReach* Terminal or *ConnectReach* 200 with Carrier privilege (see Chapter 11, *OAM&P*). The communications channel is closed when the text string “close” is entered.

Configuration Management— Maintenance

Overview

The *AnyMedia* Access System provides the following maintenance functions associated with IAT Servers:

- DS1 bank loopbacks at the IAT Server
 - Metallic access to the HDSL2 drops on the IATS4 Server.
-

DS1 loopbacks

DS1 bank loopbacks may be established on a selected IAT Server port using the Operate Loopback (OPR-LPBK) TL1 command. The loopback is released by using the Release Loopback (RLS-LPBK) TL1 command. This loopback capability is used only to test the IAT Server port transceiver: a network-originated payload is not looped back.

Metallic test access

Metallic test access to a drop on the HDSL2 IATS4 Server may be obtained by using the Connect-Test Access-Drop (CONN-TACC-DROP) TL1 command. Test access is released by using the Disconnect-Test Access-Drop (DISC-TACC-DROP) TL1 command.

Performance Management

Overview

Performance Management is the system activity for collecting and reporting data on the quality of transmission on the distribution (IAT) facilities (DS1 or HDSL2). Performance Management operation includes data collection, specification of thresholds for threshold crossing alerts (TCAs), generation of TCAs, and reports of Performance Management data. Performance Management is performed at the IAT Server end of the distribution DS1s.

DS1 (IAT) Performance Management operation

For IAT DS1 Performance Management, the system continuously collects Performance Management data internally, and an external system can retrieve this data on a 15-minute or 24-hour basis. DS1 Performance Management aligns with the recommendations in Telcordia Technologies, Inc. GR-820 for DS1 path monitoring. These measurements also apply for the HDLS2 IAT facilities.

Performance Management data

Performance Management data are collected for the following:

- Coding violations-path (CV-P)
- Severely errored framing seconds-path (SEFS-P)
- Controlled slip seconds-path (CSS-P)
- Errored seconds-line (ES-L)
- Errored seconds-path (ES-P)
- Severely errored seconds-path (SES-P)
- Unavailable seconds-path (UAS-P)

Data are collected in 15-minute intervals. For each category, current and previous 15-minute Performance Management counts are stored. In addition, for all except CV-P, 31 history counts are stored for a total of eight hours of data. All counts can be retrieved from the interface to an OS and from a TL1SI or GSI/TL1SI view interface.

Once a Performance Management count exceeds the threshold, an autonomous message is generated to indicate a TCA. The threshold values can be set externally for the individual Performance Management counts. TCA messages can be inhibited.

Performance Management capabilities

Performance Management has general capabilities for DS1 via TL1 commands as follows:

- Retrieve Performance Management information

- Set and retrieve the threshold values for TCA generation
 - Reset the Performance Management counts
 - Report the occurrence of a TCA
 - Allow/inhibit the TCA reporting.
-

System Planning and Engineering for IAT Services

6

Overview

This chapter describes the engineering information required to incorporate the IAT feature into the *AnyMedia* Access System and telecommunications network, which includes capacities, traffic engineering, default system provisioning parameters, and an Engineering Work Order.

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<i>Growth Scenarios</i>	6-5
<i>Engineering Combinations of GR-303 and INA Configurations for IAT-Only Systems</i>	6-7
<i>Default System Provisioning Parameters</i>	6-9
<i>Traffic and DS1 Engineering</i>	6-16
<i>IATS4 Server HDSL2 Cable Distance Design</i>	6-27
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<i>Management Interface Requirements</i>	6-30
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<i>Engineering Work Order for Traditional DLC Services</i>	6-32
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System Capacity

Overview

This section describes the system capacity of the *AnyMedia* Access System when equipped exclusively with IAT Servers. The *AnyMedia* Access System is capable of being equipped with a mix of APs and servers (see the *AnyMedia® Access System, Applications, Planning, and Ordering Guide*).

Maximum number of logical VRTs and VBs per *AnyMedia* FAST shelf

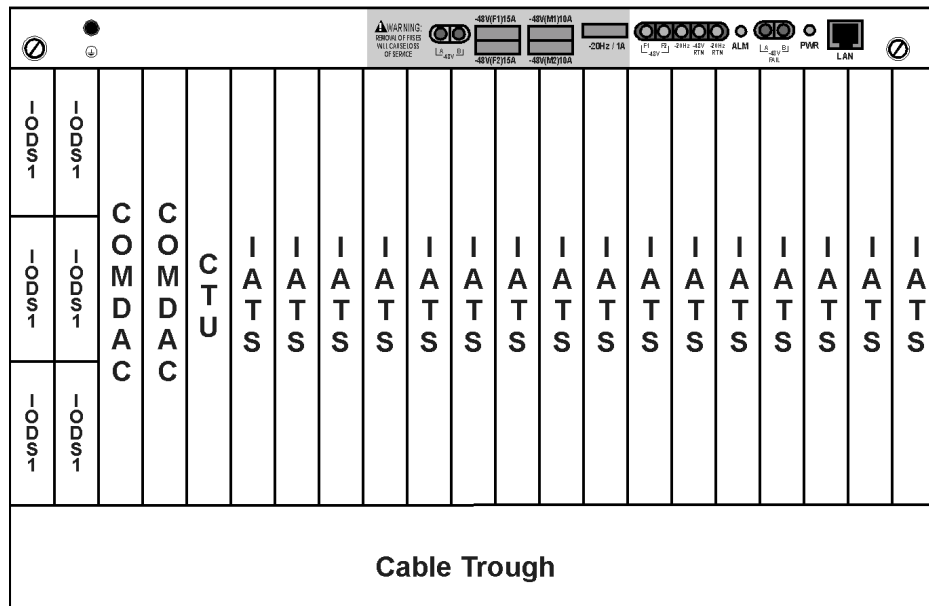
The software allows the *AnyMedia* FAST shelf to be logically divided into a number of independent VRTs and VBs that provide the different traditional DLC interfaces. The number of VRTs and VBs may be mixed as long as the total number of DS1s does not exceed 20. The following types of logical VRTs and VBs are available to provide traditional DLC telephony service interfaces:

- Up to 3 GR-303 VRTs
- Up to 20 INA VBs.

The number and type of logical VRTs and VBs needed within a particular *AnyMedia* FAST shelf depends on the mixture of locally switched and nonswitched/nonlocally switched services to be provided from the *AnyMedia* FAST shelf and on how the nonswitched/nonlocally switched services are to be managed. Capacity restrictions of the *AnyMedia* FAST shelf limit both how many of these logical VRTs and VBs may be in service at any one time and how many subscribers can be assigned to each in-service logical VRT or VB. These restrictions are defined later in this section.

Maximum number of feeder DS1 circuits per *AnyMedia* FAST shelf

An *AnyMedia* FAST shelf fully configured with IAT Servers is shown in Figure 6-1 on page 6-3. In this configuration, the *AnyMedia* FAST shelf has a maximum capacity of 6 IODS1 slot positions. There are 4 individual DS1s per IODS1, which represent a total of 24 ($6 \times 4 = 24$) DS1 circuits. One of these IODS1s serves only for protection; therefore, the maximum DS1 capacity by the five active IODS1 circuit packs is 20 DS1 ports available to the VRTs and VBs defined for that shelf. Each DS1 is capable of supporting 24 channels; therefore, the feeder capacity has a maximum of 480 ($20 \times 24 = 480$) channels.

FAST Shelf

21610_fig_008_n_3

Figure 6-1. Physical Layout of *FAST* Shelf Configured as an IAT Host**Maximum number of IAT ports per AnyMedia Access System**

The maximum number of IAT ports per *AnyMedia* Access System is 80 (5 ports on each of 16 IAT Servers, assuming it is the 5-port IAT Server).

GR-303 VRT capacity

The *AnyMedia* Access System provides the capability from one to three GR-303 VRTs. Each GR-303 VRT can support the following:

- Up to 1920 active logical lines for POTS and locally switched services supported by the *FAST* shelf. To terminate the full 1920 lines, concentration and 16 IATS5 Servers are required at the RT.
- Active and standby TMC and EOC data links located on logical DS1 #1 and DS1 #2. The TMC appears on timeslot #24, and the EOC appears on timeslot #12 on both DS1 #1 and DS1 #2.
- Between 2 and 20 active feeder DS1s per GR-303 VRT. Maximum call-carrying capacity is 476 DS0 channels ($480 - 4 = 476$), since 4 DS0s are used for the EOC and TMC channels.

- A full access TSI concentration network that allows any line assigned to the GR-303 VRT to be connected to any available DS0 timeslot on a feeder DS1. Time slot assignment is performed in response to messages exchanged with the LDS over the TMC (for per-call timeslot assignments) or EOC (for semipermanent timeslot assignments).
-

INA VB

INA VBs are the logical representations used to support nonswitched or nonlocally switched special services. INA feeder DS1s are DS1 feeder facilities of an *AnyMedia* Access System shelf that carry only nonswitched or nonlocally switched special services. INA DS1s do not connect to the local switching system. Instead, they terminate on a digital channel bank, on a DCS, or on interoffice facilities. Since there is a maximum of 20 feeder DS1 ports available in one shelf, there can be at most 20 INA VBs. However, the number of active INA VBs depends on how many of these INA VBs are cross-connected to DS1 ports. An INA feeder DS1 becomes active only when an INA VB is T1 cross-connected to one of the DS1 ports. Each INA VB has only 24 logical lines to which physical lines on IAT Servers may be T0 cross-connected.

Capacity of mixed VRT and VB configurations

A large number of different configurations are possible for the *AnyMedia* Access System shelf in terms of mixed configurations of GR-303 VRTs and INA VBs. The engineering of these mixed configurations is discussed further in *Engineering Combinations of GR-303 and INA Configurations for IAT-Only Systems* on page 6-7.

The physical limit of 20 DS1 feeder ports per *AnyMedia* Access System limits how many of the logical VRTs and VBs can be simultaneously in service. Also, the number of subscribers that may be assigned to the logical lines is determined by the smaller of the following:

- The total number of logical lines on all in-service logical VRTs and VBs
- The physical limit of 1920 lines between the *AnyMedia* Access System and the IATs.

It is possible to have on a given *FAST* shelf a mixture of VRTs and VBs, including one to three GR-303 VRTs and one or more INA VBs. For the *FAST* shelf, subscriber lines cross-connected to the VRTs and VBs can be chosen from IAT Servers. IAT lines cannot be cross-connected to TR-08 VRTs.

Growth Scenarios

Overview

This section defines system and pack growth and degrowth. Sample scenarios demonstrate the methods for performing different growth and degrowth situations.

System growth

System growth is defined as the installation and turn-up of either feeder and/or distribution capacity to an existing operational *AnyMedia* Access System. Additional feeder capacity may be needed for adding services to existing VRTs, adding new VRTs to an existing *AnyMedia* Access System, or adding an INA VB. The *AnyMedia* Access System will support the ability to modify capacity smoothly, without interrupting existing service.

System growth can include the following basic operations:

- Adding IAT Servers and provisioning T0 cross-connects
- Adding IODS1 circuit packs and provisioning T1 cross-connects
- Changing from a 2-port IATS2 Server to a 5-port IATS5 Server.



NOTE:

The basic growth (and degrowth) operations may be performed by different technicians at different times without the need to complete one task before the other.

Adding IAT Servers and provisioning T0 cross-connects

To install and provide service to an additional IAT requires the following steps:

1. Dispatch a technician to the site to insert a new IAT Server or connect to an unused IAT Server port.
2. Enter provisioning either locally at the *AnyMedia* Access System using the TL1SI or GSI interface or remotely from a centralized operations center.
3. Enter a cross-connect command for each individual T0 to provide service.
4. Enter a TL1 command for each T0 to provision the line termination object.



NOTE:

IAT growth may require removal of other APs, removal of VF cables, and the installation of cables required by the IAT Server (see the *AnyMedia*® Access System, *Installation Manual*). IAT growth also may require the re-provisioning of the AP slot to accept IAT Servers plus subshelf provisioning and association of a logical subshelf with a physical IAT Server port.

**Adding IODS1
circuit packs and T1
cross-connects**

To install and provide additional feeder capacity to a *FAST* shelf requires the following steps:

1. Turn up an unused DS1 port and/or dispatch a technician to the site to insert the IODS1 pack.
2. Enter a T1 cross-connect TL1 command for the IODS1 pack either to add capacity to an existing VRT or to create a new VRT or VB.

System degrowth

System degrowth is the removal of feeder and/or distribution capacity from an existing operational *AnyMedia* Access System. System capacity can be rearranged for load balancing or other needs by combining the growth and degrowth operations.

**NOTE:**

If IAT degrowth is to provide slots for other APs, degrowth also may require removal of cables required by the IAT Server and the installation of VF cables to support the AP to be installed (see the *AnyMedia*® Access System, *Installation Manual*). IAT degrowth also may require deletion of slot provisioning.

Engineering Combinations of GR-303 and INA Configurations for IAT-Only Systems

Overview

The *AnyMedia* Access System provides for flexible configurations and combinations of GR-303 VRTs and INA VBs, as illustrated in Figure 6-2, but the following maximums must be observed for an IAT-only system:

- Up to 3 GR-303 VRTs
- 20 INA VBs.

The number of DS1s from the GR-303 VRTs and INA VBs may be mixed as long as the total number of feeder DS1s does not exceed 20. As indicated in Figure 6-2, lines that are cross-connected to a VRT or a VB may be from any IAT.

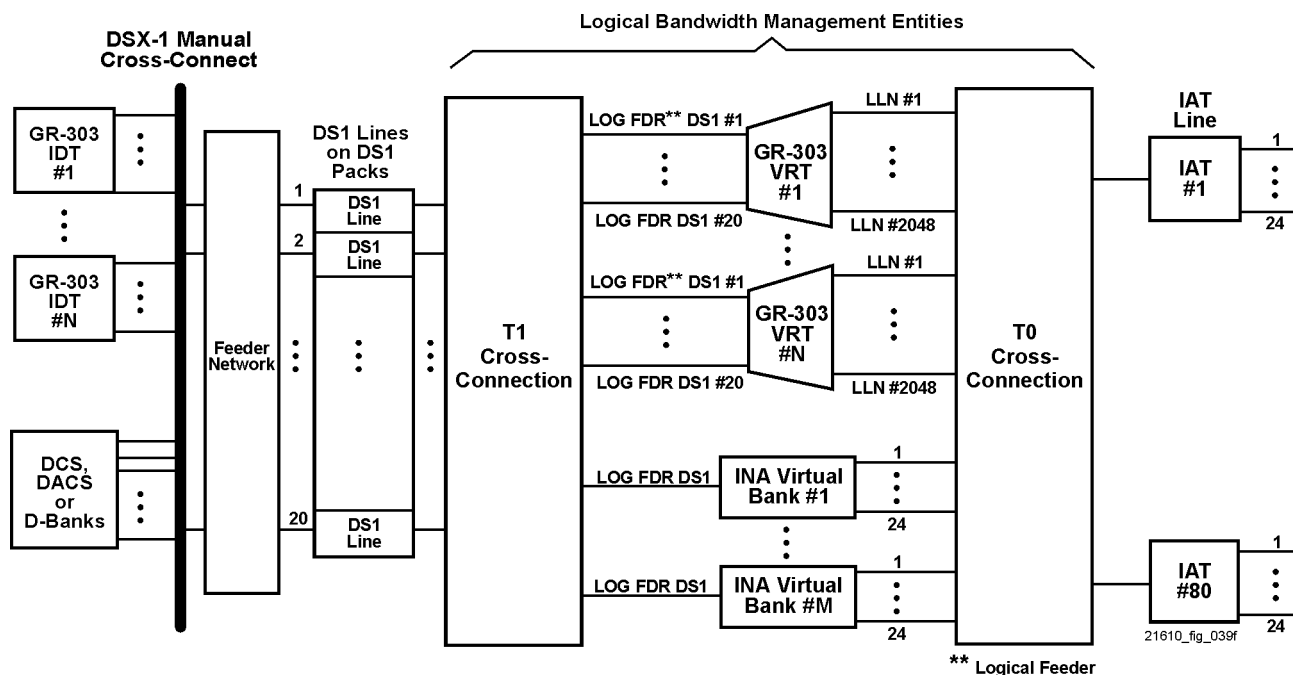


Figure 6-2. *AnyMedia* Access System with Mixed VRT and VB Configuration

Engineering constraints

Plan according to the following constraints:

- The maximum number of feeder DS1 lines supported is 20.
- Each GR-303 VRT, if assigned, must have between 2 and 20 DS1 lines.
- An INA VB can only have 1 DS1 line.

The DS1 lines on an IODS1 pack may be assigned to different VRTs and VBs in any arbitrary fashion. For example, on a given IODS1, there may be one DS1 used by an INA VB, and the other three DS1s may be used for a GR-303 VRT. It is recommended in GR-303 VRT applications that logical DS1 #1 and DS1 #2 be assigned to different IODS1 circuit packs so an unprotected IODS1 can be removed without losing the EOC and TMC of the GR-303 VRT.

For any given field application, the best way to partition an *AnyMedia* Access System into a combination of GR-303 VRTs and INA VBs is based on a number of different factors. Engineering rules are provided in the remainder of this chapter.

Engineering INA VBs

Determine the number of lines of nonlocally switched and nonswitched services to be supported by the *AnyMedia* Access System. The total number of nonswitched and nonlocally switched lines divided by 24 rounded up to the next whole number gives the minimum number of required number INA VBs. There is no traffic sensitivity in the *AnyMedia* Access System for INA VBs. However, determining the number of INA VBs involves the far-end termination. Typically, the far-end termination of an INA VB could be on one or more DCS, D4, or D5 type channel banks. This will have an impact on the engineering of the INA VBs, which includes line framing formats (SF or ESF extended framing format).

Default System Provisioning Parameters

Overview

This section provides a summary of the default provisioning parameters for the *AnyMedia* Access System. The listed parameter values are restored when the INIT-SYS TL1 command is executed during the initialization of the system.

Synchronization parameters

The default system synchronization parameters, which are established by initialization of the nonvolatile data memory, are as follows:

SYNCDMODElpd
LPPRIDS1-1-1-1
LPSECDS1-1-2-1
LINECDEb8zs
FMTesf

Related provisioning commands: SET-SYNCD, RTRV-SYNCD.

DS1 Performance Management parameters

The default DS1 Performance Management parameters, established by initialization of the nonvolatile data memory, are as follows:

CSS-P, 15 min1
CSS-P, 1 day4
ES-P, 15 min65
ES-P, 1 day648
SEFS, 15 min2
SEFS, 1 day17
SES-P, 15 min10
SES-P, 1 day100
UAS-P, 15 min3
UAS-P, 1 day10

Related provisioning command: SET-TH, RTRV-TH.

DS1 line parameters

The default DS1 line parameters are as follows:

EQLZ0
DGTH6

Related provisioning command: ED-T1, RTRV-T1.

The IP address parameters are preserved during initialization of the nonvolatile memory.

Communication interfaces' IP address parameters

The *AnyMedia* Access System supports multiple communication interfaces, and one or more can be active at the same time. Each communication interface* can be assigned its own IP address.

The default IP addresses, which are established by the initialization of the nonvolatile data memory, are as follows:

Interface	IP Address	Submask	Remote IP Address
Ethernet	0.0.0.0	0.0.0.0	N/A
ROC	0.0.0.0	0.0.0.0	0.0.0.0
CIT	0.0.0.0	0.0.0.0	0.0.0.0

The IP address parameters are preserved through system initialization and software updates.

Related provisioning commands: SET - IP, RTRV - IP.

IP routing

Routing support on the *AnyMedia* Access System will provide the ability to interconnect the *AnyMedia* Access System's communication interfaces with other communication interfaces and networks/devices connected to them. This will allow remote access to the AnyMedia Access Systems and interoperability with OSs, the EM, and the GSI.

The format of routing table entries is as follows:

Destination IP Address	Subnet Mask	Gateway	Metric
------------------------	-------------	---------	--------

Whenever a communication interface is initialized with the SET - IP command, a routing entry will be created automatically for that interface. Routes to hosts or networks that are not directly connected can be initialized later using the ENT - ROUTE command. If no IP addresses have been assigned to the interfaces, the routing table is empty. Whenever there is no specific route to the destination, use the default route by entering the keyword "default" in the destination field. Routing table parameters are preserved over system initialization and software updates.

* It is implied that the CIT interface has PPP implemented.

Related provisioning commands: ENT-ROUTE, DEL-ROUTE, RTRV-ROUTE.

SID

The default SID is system00. The default or provisioned value is preserved through system initialization.

Related provisioning commands: SET-SID, RTRV-HDR.

**Autonomous
message map
provisioning**

Upon initialization of the nonvolatile data memory, all autonomous messages are routed to all operations interfaces.

```
CITall
EOCall
TL1MAINTENANCEall
TL1MEMORYADMINISTRATIONall
TL1OTHER1all
TL1TESTall
```

Related provisioning commands: ENT-MSGMAP, RTRV-MSGMAP, INH-MSG, ALW-MSG.

**Security
provisioning**

Upon initialization of the nonvolatile data memory, the following user names and passwords are established:

```
LUCENT01UI-PSWD-01
LUCENT02UI-PSWD-02
```

Related provisioning commands: ED-USER-SECU, RTRV-USER-SECU.

**Time and date
provisioning**

Upon initialization, the time and date are set to the following:

```
TIME00:00:00
DATE1970:01:01
```

Related provisioning commands: ED-DAT, RTRV-HDR.

VFDE

The VFDE feature is inhibited when the nonvolatile data memory is initialized.

Related provisioning commands: ALW-VFDE, INH-VFDE.

Equipage provisioning

Upon initialization, the equipage provisioning (required or not required) for the system is as follows:

COMDAC-1-1r
COMDAC-1-2r
IODS1P-1r
all othersnr



NOTE:

Any circuit pack that is plugged into the shelf at the time of system initialization defaults to the equipage state of required.

Related provisioning commands: ED-CONFIG, RTRV-CONFIG.

Alarm severity provisioning

The severity of alarm conditions is provisionable. Upon initialization of the nonvolatile data memory, the severities in Table 6-1 are established.

Related provisioning commands: SET-ALMCDE, RTRV-ALMCDE.

Table 6-1. Alarm Severity Defaults

AID	Condition	Service Affect	Default Severity (NTFCNCDE1 [,NTFCNCDE2])
ap-1-all	CABLE	SA	mj
	IMPROPRMVL	SA	mj
	INT	SA	mj
	POLL	SA	mj
	PRCDERR	SA	mj

Table 6-1. Alarm Severity Defaults (Continued)

AID	Condition	Service Affect	Default Severity (NTFCNCDE1 [,NTFCNCDE2])
comdac-1-all	CPYMEMF	NSA	mn
	DBCRRPT	NSA	mn
	DBMEMTRF	NSA	mn
	IMPROPRMVL	NSA	mn
	INT	SA	cr
	INT	NSA	mn
	PRCDERR	NSA	mn
	SFTCRRPT	NSA	mn
	SFTERR	NSA	mn
	SWFTDWNF	NSA	mn
	UNLATCH	NSA	mn
ctu-1	IMPROPRMVL	NSA	mn
	INT	NSA	mn
	POLL	NSA	mn
ds1-1-all	AIS	SA	mj
	DIGRPF	SA	mj
	LOF	SA	mj
	LOS	SA	mj
	SYNC	SA	cr
	SYNC	NSA	mn
	T-BERL	SA	mj
	T-BERL	NSA	mn
	YEL	SA	mj
ext-1-all	SYNC	SA	cr
	SYNC	NSA	mn
iatdfr-all	INT	SA	mj
iatsp-1-all	AIS	SA	mj
	INT	SA	mj
	LOF	SA	mj
	LOS	SA	mj
	T-BERL	SA	mj
	T-BERL	NSA	mn
	YEL	SA	mj

Table 6-1. Alarm Severity Defaults (Continued)

AID	Condition	Service Affect	Default Severity (NTFCNCDE1 [,NTFCNCDE2])
iods1-1-all iods1p-1	IMPROPRMVL	SA	mj
	IMPROPRMVL	NSA	mn
	INT	SA	mj
	INT	NSA	mn
	POLL	SA	mj
	POLL	NSA	mn
pwr1-1-all	PWR	SA	cr
sh-1	BKUPMEMP	SA	cr
	RINGF	SA	cr
	SYNCOOS	SA	cr
v303-all	INT	SA	cr, mj
v3eoc-all	INT	SA	cr
	INT	NSA	mn
v3tmc-all	INT	SA	cr
	INT	NSA	mn

The environmental alarm default severities are established as shown in Table 6-2 on page 6-15.

Related provisioning command: SET-ATTR-ENV.

Table 6-2. Environmental Alarm Defaults

AID	Alarm Type	Default Severity ^a
mc-1-all	ACF	mn
	BD	mj
	FAN	mn
	MJF	mj
	MNF	mn
	PMJ	mj
	PMN	mn
	PWR	cr
	TAMPER	mn
	MISC1	mn
	MISC2	mn
	MISC3	mn
	MISC4	mn
	MISC5	mn
	MISC6	mn
	MISC7	mn
	MISC8	mn

^aIf the environmental alarm parameters have not been provisioned, the default values are minor (mn).

Traffic and DS1 Engineering

Overview

The information provided in this section applies to IAT-only systems. For information about mixed systems (a combination of APs and IAT Servers), see the AnyMedia® Access System, *Applications, Planning, and Ordering Guide*.

Traffic and DS1 engineering of the AnyMedia Access System determines the proper number of DS1 feeders to be allocated for the desired probability of blocking, types of service to be engineered, and selected interfaces (INA, GR-303). Traffic engineering applies only to the GR-303 interfaces, and DS1 engineering applies to the INA VBs. Projected growth for the RT should be considered when engineering the AnyMedia Access System.

The traffic and DS1 engineering principles described in this section apply to the AnyMedia Access System only. Any blocking in the local digital switch should be considered separately.

Principles of the AnyMedia Access System FAST shelf traffic model

For an AnyMedia Access System dedicated to IAT hosting, the principles that apply to the traffic model include the following:

- A total of 20 DS1 feeders may be engineered per FAST shelf.
 - Up to 20 INA VBs may be engineered per FAST shelf.
 - Up to 3 GR-303 VRTs may be engineered per FAST shelf.
 - A GR-303 VRT requires a minimum of 2 DS1 feeders to support the primary and secondary data links to the switch.
 - Total CCS (hundred call seconds) traffic for a GR-303 VRT is defined as originating plus terminating CCS for the dynamically assigned lines.
 - Semipermanent assignments for circuits carried over a GR-303 interface (nailed up or hairpinned in the switching system) are calculated separately.
 - Semipermanent connections that are not carried over a GR-303 interface must be carried on INA spans, and these are calculated separately.
-

INA VBs—DS1 engineering

INA VB traffic engineering principles include the following:

- The FAST shelf supports INA VBs for nonswitched and nonlocally switched circuits not terminating in a GR-303 interface (e.g., an INA DS1 terminating on a channel bank or cross-connect system in a CO). The INA VB is assigned a single DS1 feeder.
- Up to 24 DS0s can be assigned to an INA VB.

- All lines assigned to a given INA VB must terminate or route through the far end termination of the INA DS1 (e.g., if an INA DS1 terminates on a channel bank without an intervening DS0 level cross-connect system, all lines assigned to the INA VB will appear at the channel bank).
- The situation where some nonswitched or nonlocally switched circuits terminate on one channel bank and other nonswitched or nonlocally switched circuits terminate on a different channel bank may require multiple INA VBs. If the INA DS1s used to transport the circuits do not pass through an intervening DS0 level cross-connect system, the two groups of circuits must be assigned to separate INA VBs even if the two channel banks are in the same CO.

GR-303 VRT— traffic engineering

For an *AnyMedia* Access System dedicated to IAT hosting, the traffic engineering of the GR-303 interfaces must include the following:

- How many lines are to be connected to each GR-303 VRT
- The probability of blocking of the subscribers on each GR-303 VRT
- The number of the VRT lines to be allocated to POTS-like and semipermanent services
- The average CCS per line for POTS-like lines for traffic modeling.

The *AnyMedia* Access System provides the capability to concentrate traffic on the GR-303 interface (i.e., more lines may be assigned to the GR-303 VRT than there is bandwidth [DS0s] available to carry calls on them if calls were attempted on all lines at the same time). This section provides the details of the traffic model used to calculate the traffic capacity required for a GR-303 VRT.

For more information on GR-303, see Chapter 6, *Traditional DLC Interfaces*, in the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*. Also in the APOG, see in Chapter 8, *OAM&P For Traditional DLC Services*, the *Configuration Management—Service Activation* section for more details on GR-303 VRT cross-connections.

The *AnyMedia* Access System GR-303 VRT transport DS1s must be sized to meet the blocking standards of service provided by the telephone operating company. Estimate the level of telephone traffic to determine the equipment needed. The Erlang *B* formula is used to calculate the number of DS0s required to achieve the desired probability of blocking based on the number of dynamically assigned lines on the GR-303 VRT, and the traffic these lines are expected to generate.

GR-303— probability of blocking

The Erlang *B* formulas in Table 6-1 on page 6-20 for a GR-303 VRT is based on a probability of blocking equal to 0.5% ($P(B) = 0.005$). The GR-303 interface is a blocked-call-cleared model, and the Erlang *B* formula is suitable for traffic

engineering this interface for the specific level of blocking. The probability of blocking (i.e., the probability a call is blocked because all resources are busy) is one of the measures used to determine the grade of service received by the subscriber.

GR-303—traffic modeling

Traffic modeling includes determining the bandwidth needed for concentrated services and for nailed up (semi-permanent) services and calculating the DS1 feeders to serve these customers. Consider the following when engineering the GR-303 VRT services:

- The CCS/line for locally switched POTS-like services and total number of POTS-like lines, including all locally switched IAT lines
- The number of semipermanently assigned DS0s dedicated to special service circuits on each GR-303 VRT.

Consider the following to calculate DS1 feeders for each GR-303 VRT:

1. Determine the total projected originating plus terminating CCS for POTS-like lines on the GR-303 VRT.
2. From Table 6-1 on page 6-20, determine the number of DS0s required to provide this traffic capacity at the $P(B) = 0.005$ blocking level.
3. To this number, add 4 DS0s for the primary and secondary EOCs and TMCs.
4. Add the number of DS0s for each nailed-up or hairpinned special service circuit.
5. If a remote LAN is provided for remote access, add 1 DS0 to the nailed-up DS0 count obtained in Step 4 above.
6. Divide the total number of DS0s required for the GR-303 VRT by 24. If the result is not a whole number, round the result up to the next whole number to determine the total number of DS1 feeders required for the GR-303 VRT. This total must be at least 2 DS1s but not more than 20 DS1s. If the total exceeds 20, the *FAST* shelf cannot support the expected load, and some of the load will need to be moved to another *FAST* shelf or other facilities.
7. Add the total number of feeders required for the GR-303 VRTs and INA VBs. This total for the *AnyMedia* Access System must not be more than 20 DS1s and, if there is one or more GR-303 VRTs, each GR-303 VRT must have at least two DS1s.



NOTE:

If the total number of DS0s required for the switched services on the GR-303 feeder exceeds the number of timeslots between the equipment terminating the GR-303 interface on the digital switch and the switch fabric

available for switched services, then some of the load will need to be moved to another *FAST* shelf or other facilities.

Mixed system traffic engineering

When engineering an *AnyMedia* Access System for a mixed configuration, which is some combination of GR-303 and/or INA, the procedure is as follows:

1. Determine the number of DS1 feeders required for each GR-303 VRT.
 2. Determine the number of INA feeders used by the system.
 3. Add the total number of feeders required for the GR-303 VRTs and INA VBs. This total for the *AnyMedia* Access System must not be more than 20 DS1s and, if there is one or more GR-303 VRTs, each GR-303 VRT must have at least two DS1s.
-

Erlang *B* formula tables

Table 6-1 on page 6-20 is the Erlang *B* formula for probability of blocking equal to 0.5%. When the Erlang *B* formula is solved for a specific probability of blocking, the offered load is obtained in erlangs. The traffic generated by a line is generally measured in CCS. One erlang is equal to 36 CCS. Table 6-1 provides the traffic capacity in both CCS and erlangs.

Table 6-1. DS0 Loading Capacity (Erlang *B* Assumption)

P(B) = 0.005			P(B) = 0.005			P(B) = 0.005		
DS0s	CCS	Erlangs	DS0s	CCS	Erlangs	DS0s	CCS	Erlangs
1	0.2	0.005	25	539.	15.0	49	1264.	35.1
2	3.8	0.105	26	568.	15.8	50	1295.	36.0
3	12.6	0.349	27	597.	16.6	51	1326.	36.9
4	25.2	0.701	28	626.	17.4	52	1358.	37.7
5	40.8	1.13	29	655.	18.2	53	1389.	38.6
6	58.4	1.62	30	685.	19.0	54	1421.	39.5
7	77.7	2.16	31	714.	19.9	55	1452.	40.4
8	98.3	2.73	32	744.	20.7	56	1484.	41.2
9	119.	3.33	33	774.	21.5	57	1515.	42.1
10	142.	3.96	34	804.	22.3	58	1547.	43.0
11	165.	4.61	35	834.	23.2	59	1579.	43.9
12	190.	5.27	36	864.	24.0	60	1611.	44.8
13	214.	5.96	37	894.	24.8	61	1643.	45.6
14	239.	6.66	38	924.	25.7	62	1675.	46.5
15	265.	7.38	39	955.	26.5	63	1706.	47.4
16	291.	8.10	40	985.	27.4	64	1738.	48.3
17	318.	8.83	41	1016.	28.2	65	1771.	49.1
18	344.	9.58	42	1047.	29.1	66	1803.	50.0
19	371.	10.3	43	1077.	29.9	67	1835.	51.0
20	399.	11.1	44	1108.	30.8	68	1867.	51.9
21	426.	11.9	45	1139.	31.7	69	1899.	52.8
22	454.	12.6	46	1170.	32.5	70	1931.	53.7
23	482.	13.1	47	1201.	33.4	71	1964.	54.6
24	511.	14.2	48	1232.	34.2	72	1996	55.5

Table 6-1. DS0 Loading Capacity (Erlang *B* Assumption) (Continued)

P(B) = 0.005			P(B) = 0.005			P(B) = 0.005		
DS0s	CCS	Erlangs	DS0s	CCS	Erlangs	DS0s	CCS	Erlangs
73	2028.	56.4	97	2813.	78.2	121	3611.	100.3
74	2061.	57.3	98	2846.	79.1	122	3644.	101.2
75	2093.	58.2	99	2879.	80.0	123	3678.	102.2
76	2125.	59.1	100	2912.	80.9	124	3711.	103.1
77	2158.	60.0	101	2945.	81.8	125	3745.	104.0
78	2190.	60.9	102	2978.	82.7	126	3778.	105.0
79	2223.	61.8	103	3012.	83.7	127	3812.	105.9
80	2256.	62.7	104	3045.	84.6	128	3845.	106.8
81	2288.	63.6	105	3078.	85.5	129	3879.	107.8
82	2321.	64.5	106	3111.	86.4	130	3912.	108.7
83	2353.	65.4	107	3144.	87.4	131	3946.	109.6
84	2386.	66.3	108	3177.	88.3	132	3979.	110.5
85	2419.	67.2	109	3211.	89.2	133	4013.	111.5
86	2452.	68.1	110	3244.	90.1	134	4046.	112.4
87	2484.	69.0	111	3277.	91.0	135	4080.	113.3
88	2517.	69.9	112	3310.	92.0	136	4114.	114.3
89	2550.	70.8	113	3344.	92.9	137	4147.	115.2
90	2583.	71.8	114	3377.	93.8	138	4181.	116.2
91	2616.	72.7	115	3410.	94.7	139	4215.	117.1
92	2648.	73.6	116	3444.	95.7	140	4248.	118.0
93	2681.	74.5	117	3477.	96.6	141	4282.	119.0
94	2714.	75.4	118	3510.	97.5	142	4316.	119.9
95	2747.	76.3	119	3544.	98.5	143	4349.	120.8
96	2780.6	77.2	120	3577.	99.4	144	4383.	121.8

Table 6-1. DS0 Loading Capacity (Erlang *B* Assumption) (Continued)

DS0s	P(B) = 0.005		DS0s	P(B) = 0.005		DS0s	P(B) = 0.005	
	CCS	Erlangs		CCS	Erlangs		CCS	Erlangs
145	4417.	122.7	169	5230.	145.3	193	6047.	168.0
146	4451.	123.6	170	5264.	146.2	194	6082.	168.9
147	4484.	124.6	171	5298.	147.2	195	6116.	169.9
148	4518.	125.5	172	5332.	148.1	196	6150.	170.8
149	4552.	126.5	173	5366.	149.1	197	6184.	171.8
150	4586.	127.4	174	5400.	150.0	198	6218.	172.7
151	4620.	128.3	175	5434.	150.9	199	6253.	173.7
152	4653.	129.3	176	5468.	151.9	200	6287.	174.67
153	4687.	130.2	177	5502.	152.8	201	6321.	175.6
154	4721.	131.2	178	5536.	153.8	202	6355.	176.5
155	4755.	132.1	179	5570.	154.7	203	6389.	177.5
156	4789.	133.0	180	5604.	155.7	204	6424.	178.4
157	4823.	134.0	181	5638.	156.6	205	6458.	179.4
158	4856.	134.9	182	5672.	157.6	206	6492.	180.4
159	4890.	135.9	183	5706.	158.5	207	6526.	181.3
160	4924.	136.8	184	5740.	159.5	208	6561.	182.3
161	4958.	137.7	185	5774.	160.4	209	6595.	183.2
162	4992.	138.7	186	5808.	161.4	210	6629.	184.2
163	5026.	139.6	187	5843.	162.3	211	6663.	185.1
164	5060.	140.6	188	5877.	163.3	212	6698.	186.1
165	5094.	141.5	189	5911.	164.2	213	6732.	187.0
166	5128.	142.5	190	5945.	165.2	215	6801.	188.9
167	5162.	143.4	191	5979.	166.1	215	6801.	188.9
168	5196.	144.3	192	6013.	167.0	216	6835.	189.9

Table 6-1. DS0 Loading Capacity (Erlang *B* Assumption) (Continued)

DS0s	P(B) = 0.005		DS0s	P(B) = 0.005		DS0s	P(B) = 0.005	
	CCS	Erlangs		CCS	Erlangs		CCS	Erlangs
217	6869.	190.8	241	7694.	213.7	265	8522.	236.7
218	6904.	191.8	242	7729.	214.7	266	8557.	237.7
219	6938.	192.7	243	7763.	215.7	267	8592.	238.7
220	6972.	193.7	244	7798.	216.6	268	8626.	239.6
221	7007.	194.6	245	7832.	217.6	269	8661.	240.6
222	7041.	195.6	246	7867.	218.5	270	8695.	241.5
223	7075.	196.5	247	7901.	219.5	271	8730.	242.5
224	7110.	197.5	248	7936.	220.4	272	8764.	243.5
225	7144.	198.5	249	7970.	221.4	273	8799.	244.4
226	7178.	199.4	250	8005.	222.4	274	8834.	245.4
227	7213.	200.4	251	8039.	223.3	275	8868.	246.4
228	7247.	201.3	252	8074.	224.3	276	8903.	247.3
229	7281.	202.3	253	8108.	225.2	277	8937.	248.3
230	7316.	203.2	254	8143.	226.2	278	8972.	249.2
231	7350.	204.2	255	8177.	227.2	279	9007.	250.2
232	7385.	205.1	256	8212.	228.1	280	9041.	251.2
233	7419.	206.1	257	8246.	229.1	281	9076.	252.1
234	7453.	207.0	258	8281.	230.0	282	9110.	253.1
235	7488.	208.0	259	8315.	231.0	283	9145.	254.0
236	7522.	209.0	260	8350.	232.0	284	9180.	255.0
237	7557.	209.9	261	8384.	232.9	285	9214.	256.0
238	7591.	210.9	262	8419.	233.9	286	9249.	257.0
239	7626.	211.8	263	8453.	234.8	287	9284.	257.9
240	7660.	212.8	264	8488.	235.8	288	9318.	258.9

Table 6-1. DS0 Loading Capacity (Erlang *B* Assumption) (Continued)

DS0s	P(B) = 0.005		DS0s	P(B) = 0.005		DS0s	P(B) = 0.005	
	CCS	Erlangs		CCS	Erlangs		CCS	Erlangs
289	9353.	259.8	313	10185.	282.9	337	11020	306.1
290	9387.	260.8	314	10220.	283.9	338	11055	307.1
291	9422.	261.7	315	10255.	284.9	339	11089.	308.1
292	9457.	262.7	316	10290.	285.8	340	11124.	309.0
293	9491.	263.7	317	10324.	286.8	341	11159.	310.0
294	9526.	264.6	318	10359.	287.8	342	11194.	311.0
295	9561.	265.6	319	10394.	288.7	343	11229	311.9
296	9595.	266.6	320	10429.	289.7	344	11263.	312.9
297	9630.	267.5	321	10463.	290.7	345	11298.	313.9
298	9665.	268.5	322	10498.	291.6	346	11333.	314.8
299	9699.	269.4	323	10533.	292.6	347	11368.	315.8
300	9734.	270.4	324	10568.	293.6	348	11403.	316.8
301	9769.	271.4	325	10602.	294.5	349	11438.	317.7
302	9804.	272.3	326	10637.	295.5	350	11472	318.7
303	9838.	273.3	327	10672.	296.5	351	11507.	319.7
304	9873.	274.3	328	10707.	297.4	352	11542.	320.6
305	9908.	275.2	329	10741.	298.4	353	11577.	321.6
306	9942.	276.2	330	10776.	299.4	354	11612.	322.6
307	9977.	277.2	331	10811.	300.3	355	11647.	323.5
308	10012.	278.1	332	10846.	301.3	356	11681.	324.5
309	10046.	279.1	333	10881.	302.3	357	11716.	325.5
310	10081.	280.0	334	10915.	303.2	358	11751.	326.4
311	10116.	281.0	335	10950.	304.2	359	11786.	327.4
312	10151.	282.0	336	10985.	305.2	360	11821.	328.4

Table 6-1. DS0 Loading Capacity (Erlang *B* Assumption) (Continued)

P(B) = 0.005			P(B) = 0.005			P(B) = 0.005		
DS0s	CCS	Erlangs	DS0s	CCS	Erlangs	DS0s	CCS	Erlangs
361	11856.	329.4	385	12693.	352.6	409	13532.	375.9
362	11891	330.3	386	12728.	353.6	410	13567.	376.9
363	11925.	331.3	387	12763.	354.5	411	13602.	377.8
364	11960.	332.2	388	12798.	355.5	412	13637.	378.8
364	11960.	332.2	389	12833.	356.5	413	13672.	379.8
366	12030.	334.2	390	12868.	357.5	414	13707	380.8
367	12065.	335.2	391	12903.	358.4	415	13742.	381.7
368	12100.	336.1	392	12938.	359.4	416	13777.	382.7
369	12135.	337.1	393	12973.	360.4	417	13812.	383.7
370	12170.	338.1	394	13008.	361.3	418	13847.	384.7
371	12204.	339.0	395	13042.	362.3	419	13882.	385.7
372	12239.	340.0	396	13077.	363.3	420	13917.	386.6
373	12274.	341.0	397	13112.	364.2	421	13952.	387.6
374	12309.	341.9	398	13147.8	365.3	422	13987.	388.5
375	12344.	342.9	399	13182.	366.2	423	14022.	389.5
376	12379.	343.9	400	13217.	367.2	424	14057.	390.5
377	12414.	344.8	401	13252.	368.1	425	14092.	391.5
378	12449.	345.8	402	13287.	369.1	426	14127.	392.4
379	12484.	346.8	403	13322.	370.1	427	14162.	393.4
380	12519.	347.8	404	13357.	371.0	428	14197.	394.4
381	12553.	348.7	405	13392.	372.0	429	14232.	395.3
382	12588.	349.7	406	13427.	373.0	430	14267.	396.3
383	12623.	350.7	407	13462.	374.0	431	14302.	397.3
384	12658.	351.6	408	13497.	375.0	432	14337.	398.3

Table 6-1. DS0 Loading Capacity (Erlang *B* Assumption) (Continued)

P(B) = 0.005			P(B) = 0.005			P(B) = 0.005		
DS0s	CCS	Erlangs	DS0s	CCS	Erlangs	DS0s	CCS	Erlangs
433	14372.	399.2	457	15213.	422.6			
434	14407.	400.2	458	15248.	423.6			
435	14442.	401.2	459	15283.	424.5			
436	14477	402.2	460	15318.	425.5			
437	14512.	403.1	461	15353.	426.5			
438	14547.	404.1	462	15388.	427.5			
439	14582.	405.1	463	15423.	428.4			
440	14617.	406.0	464	15458.	429.4			
441	14652.	407.0	465	15493.	430.4			
442	14687.	408.0	466	15529	431.4			
443	14722.	409.0	467	15564.	432.3			
444	14757.	409.9	468	15599.	433.3			
445	14792.	410.9	469	15634.	434.3			
446	14827.	411.9	470	15669.	435.3			
447	14862.	412.9	471	15704.	436.2			
448	14897.	413.8	472	15739.	437.2			
449	14932.	414.8	473	15774.	438.2			
450	14967.	415.8	474	15809.	439.2			
451	15003.	416.8	475	15844.	440.1			
452	15038.	417.7	476^a	15879.	441.1			
453	15073.	418.7						
454	15108.	419.7						
455	15143.	420.6						
456	15178.	421.6						

^aThe table ends at 476 rather than 480 (24 times 20 DS1s) because four DS0s are reserved for the TMC and EOC that cannot be allocated for service in a GR-303 VRT.

IATS4 Server HDSL2 Cable Distance Design

Overview

The range of the HDSL2 line connected to the IATS4 Server is based on carrier serving area design rules. These rules are found in *Telcordia* TR-000057.

Major characteristics of rules

Generally, the carrier serving area design rules have the following major characteristics:

- Nonloaded cable only
- 19-, 22-, or 24-gauge cables may not exceed 12,000 feet
- 26-gauge cable may not exceed 9,000 feet
- Total bridged tap length may not exceed 2,500 feet.

See *Telcordia* TR-57 for added restrictions.

HDSL2 IATS4 Server to IAT with DSX-1 Interface Application

Overview

The IATS4 Server provides four HDSL2 ports that may be connected to outside plant cables. The remote end of the outside plant cables must be terminated on either of the following:

- HDSL2 interface in an IAT
 - HDSL2 to DSX-1 converter.
-

End-to-end overview

An end-to-end overview of the application is as follows:

- *AnyMedia FAST* shelf with IATS4 Server
 - Outside plant cable
 - HDSL2 to DSX-1 converter
 - IAT with DSX-1 interface, such as the *ConnectReach* Terminal or the *ConnectReach* 200.
-

Example of application

Figure 6-3 illustrates this application. The figure shows one example of a remote HDSL2 to DSX-1 converter, the H2TU-R-402 List 1, a *PairGain HiGain Solitaire* product. The enclosure to house a single circuit card is the *HiGain* Indoor Enclosure, Model HRE-420.

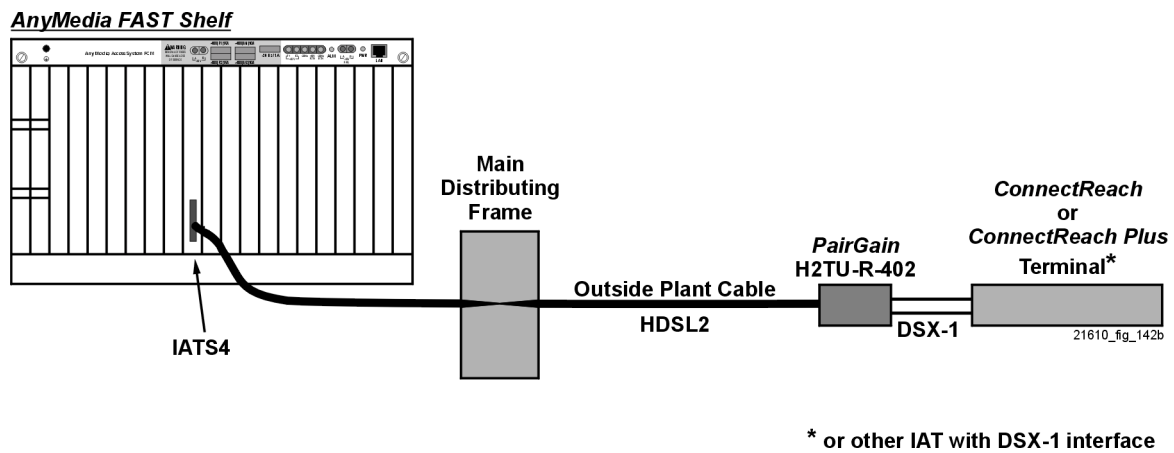


Figure 6-3. HDSL2 IATS4 Server to IAT with DSX-1 Interface Application

Management Interface Requirements

For information about this topic, see *Management Interface Requirements* in Chapter 10, *System Planning and Engineering for Traditional DLC Services*, of the AnyMedia® Access System, *Applications, Planning, and Ordering Guide*.

Product Reliability

**Compliance with
Telcordia
Technologies, Inc.
reliability standards**

The *AnyMedia* Access System adheres to applicable reliability sections of the following Telcordia Technologies, Inc. standards:

TR-NWT-000057: Functional Criteria for Digital Loop Carrier Systems

TR-NWT-000332: Reliability Prediction Procedure for Electronic Equipment

TR-NWT-000357: Generic Requirements for Assuring the Reliability of Components Used in Telecommunications Systems

TR-NWT-000418: Generic Reliability Assurance Requirements for Fiber Optic Transport Systems

TA-NWT-000909: Generic Requirements and Objectives for Fiber in the Loop Systems.

Engineering Work Order for Traditional DLC Services

Overview

An example of an Engineering Work Order for Traditional DLC Services that can be used by a technician to complete initial turn-up of an *AnyMedia* Access System RT FAST shelf is in Appendix E, *Engineering Work Order for Traditional DLC Services*, of the *AnyMedia® Access System, Applications, Planning, and Ordering Guide*.

Following is an Engineering Work Order for Traditional DLC Services that has been marked up for *ConnectReach* Terminal services. This Work Order contains only the sections that are needed for *ConnectReach* services and provides the following functions:

- Identifies location of the *AnyMedia* Access System to be worked on
- Installs COMDACs (duplex) (TU-110 RT)
- Installs/verifies software load (TU-130 RT)
- Installs an LPS105 IATS5 Server in AP slot no. 3 (TU-220 RT)
- T0 cross-connects GR-303 VRT, port 101 to the IAT (*ConnectReach* Terminal) no. 67, port 1 (TU-260 RT)
- Provisions the GR-303 VRT, port 101 parameters (TU-260 RT)
- Provisions T1 parameters for the fifth port of the LPS105 IATS5 Server in AP slot no. 3 (TU-805 RT)
- Provisions the IAT (*ConnectReach* Terminal) no. 67 to be a type "IAT01" IAT (TU-805 RT)
- Cross-connects IAT (*ConnectReach* Terminal) no. 67 to the fifth port of the LPA105 IATS5 Server in AP slot no. 3 (TU-820 RT).

This Work Order completes all work on the *AnyMedia* RT shelf. To complete service, a provisioned *ConnectReach* Terminal must be connected to the *AnyMedia* Access System.

Type of System: AnyMedia RTSoftware Release (Version): R 1.7.2Location: Bay Floor 2, Aisle 5, Bay 4 Shelf 3Address: BLTMMD01DC0

COMDAC Installation**TU-110 RT**

COMDAC in COM-1 Slot



COMDAC in COM-2 Slot

CTU Installation**TU-120a RT; TU-120b RT**CTU not required: (go to TU-130)☐

Select Link:

☐

LAN

Serial Port:

COM1

☐

COM2

☐

COM3

☐

COM4

☐

• Host: ((IP Address) _____)

• User ID

☐

default

☐

Other _____

• Password

☐

default

☐

Other _____

Settings: (not applicable for LAN)

• Baud Rate: (Maximum Settings)

☐

19200

☐

Other _____

Verify COMDAC Software**TU-130 RT**• Software Version R 1.7.2**Clearing NVDS Provisioning Memory****TU-140a RT, TU-140b RT**☐ Manual**Manual Provisioning****TU-260 RT**

• Cross Connects for DLT-CRS-T0 and ENT-CRS-T0

☐ AID Grouping

<u>Logical AID</u>			<u>Physical AID</u>			
<u>Entity</u>	<u>P1</u>	<u>P2</u>	<u>Entity</u>	<u>P1</u>	<u>P2</u>	<u>P3</u>
inads0-____-____	____	____	drop-1-____-____	drop- 1	____	____
inads0- -	-	-			-	-
inads0-____-____	____	____	drop- 1	____	____	____
inads0- -	-	-			-	-
inads0-____-____	____	____	drop- 1	____	____	____
inads0-____-____	____	____	drop- 1	____	____	____
inads0-____-____	____	____	drop- 1	____	____	____
inads0-____-____	____	____	drop- 1	____	____	____
inads0-____-____	____	____	drop- 1	____	____	____
inads0-____-____	____	____	drop- 1	____	____	____
v3dp- <u>1</u> <u>101</u>			iatvdp-____-1-____	iatvdp- <u>67</u>	1	<u>1</u>
v3dp-____-____	-	-		-		-
v3dp-____-____	____	____	iatvdp-____	____	1	____
v3dp-____-____	____	____	iatvdp-____	____	1	____
v3dp-____-____	____	____	iatvdp-____	____	1	____
v3dp-____-____	____	____	iatvdp-____	____	1	____
v3dp-____-____	____	____	iatvdp-____	____	1	____
v3dp-____-____	____	____	iatvdp-____	____	1	____
v3dp-____-____	____	____	iatvdp-____	____	1	____
v3dp-____-____	____	____	iatvdp-____	____	1	____
			m2drop-1-____-____	m2drop- 1	____	____
			m2drop- 1	____	____	____
			m2drop- 1	____	____	____
			m2drop- 1	____	____	____

	m2drop-	1	_____	_____
	m2drop-	1	_____	_____
	m2drop-	1	_____	_____
	m2drop-	1	_____	_____
roc-1	roc-	1	NA	NA

• Cross Connects for DLT-CRS-T0

INCL

☐	NO
☐	YES

• Cross Connects for ENT-CRS-T0

CCT

☐	2WAY
☐	2WAYBDL

AP Installation/Growth**TU-220 RT**

• Install APs

<u>AP SLOT #</u>	<u>AP TYPE</u>	<u>AP SLOT #</u>	<u>AP TYPE</u>
1	_____	9	_____
2	_____	10	_____
3	- <u>LPS105</u>	11	_____
	-		
4	_____	12	_____
5	_____	13	_____
6	_____	14	_____
7	_____	15 / AFM	_____
8	_____	16 / AFM	_____

Manual Provisioning (contd) - ENT-T0**TU-260 RT; TU-270 RT**

• T0 Parameters for ENT-T0

Logical AID						EFTT (3)			LOSS (3)			
Entity	P1	P2	P1	P2	GSEF	SST	CLEI (0 to 10 character string)	NO	YES	ALC2	ALC5	AUTO
inads0- _____	_____	_____	OR	v3dp- <u>1</u> <u>101</u>	<u>DFLT</u>	_____	_____		3			3
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					
inads0- _____	_____	_____		v3dp- _____	_____	_____	_____					

For more parameters, please copy blank form above and attach

IAT Server Installation / Growth**TU-805 RT**Shelf #AP Slot #AP TypeIAT Server Slot #• **IAT for ED-T1**

AID			EQLZ	LINECDE (3)		FMT (3)		DGTH (3)				PPST (3)	
{1-16} {1-2*}			0 - 655	B8ZS	ZCS	ESF	SF	4	5	6	7	IS	OOS
iatsp-1-	<u>3</u>	<u>5</u>	<u>0</u>	3		3					3	3	
	-	-	-										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										
iatsp-1-	_____	_____	_____										

* LPS100 AID = {1-16} {1-2}; future servers may have different AIDs

• **ENT-SUBSH**Logical AIDSUBSH_TYPE (3)

iat	<u>67</u>	3	• IAT01		• IAT02
	-				
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02
iat	_____		• IAT01		• IAT02

iat _____	• IAT01	• IAT02
iat _____	• IAT01	• IAT02

For more parameters, please copy blank form above and attach

End-to-End Tests for the *ConnectReach* Terminal - *ENT-CRS-SUBSHELF***TU-820 RT**
☐ Not Applicable - Go to *TU -820a*
• Cross Connects for ENT-CRS-SUBSHELF

Logical AID					Physical AID			
Entity	P1	P2	P3		Entity	P1	P2	P3
iatfdr-	<u>67</u>	1	1	AND	iatsp--	1	<u>3</u>	<u>5</u>
							—	—
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____
iatfdr-	_____	1	1		iatsp--	1	_____	_____

Ordering

All ordering information is now located in the AnyMedia® Access System, *Ordering Guide*, code 363-211-125. Ordering information has been moved to a separate document to facilitate updating the information

Overview

Purpose

This chapter provides an introduction to the *ConnectReach* Terminal and *ConnectReach* 200 Series (hereinafter referred to as *ConnectReach* 200), briefly describing their features, benefits, applications, and services.

Features and benefits

The *ConnectReach* Terminal and *ConnectReach* 200 “extend” the *AnyMedia* Access System backplane to the customer premises.

The *ConnectReach* Terminal and *ConnectReach* 200 can be ordered in both AC and DC versions. For DC versions, an optional 120 V AC/48 V DC power converter with battery backup can be obtained, if needed.

Applications and services

***ConnectReach* Terminal**

As shown in Figure 7-1 on page 7-2, the IAT multiplexes the bandwidth for each type of service onto a network T1/DS1 connection that passes to the *FAST* shelf. The *AnyMedia* Access System then routes the bandwidth of each service to the proper destination. For example, the *FAST* shelf routes the voice channels to the LDS through a GR-303 interface. It routes the digital data bandwidth to a frame relay network connected to an Internet service provider and/or private corporate network using an INA interface, and also routes special services to an INA DS1 port. This port may terminate on an INA bank equivalent such as a D4 or DCS.

Applications of the *ConnectReach* Terminal also offers the following two options:

- *LCR* feature—Allows the IAT to route automatically incoming or outgoing calls to customer-selectable destinations such as a CO switch
- *BOX* feature—Allows access to features such as call waiting and call forwarding through the IAT equipment located on customer premises without involving the LDS (the *BOX* feature requires the *LCR* feature).

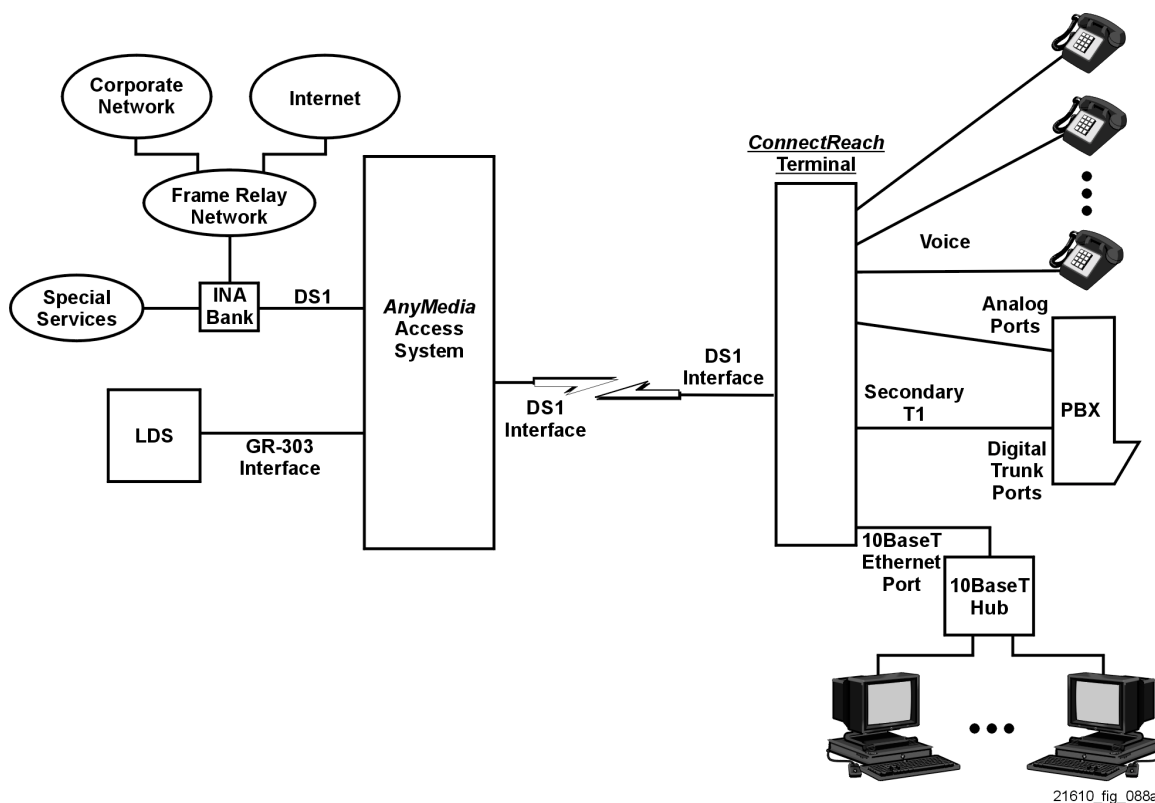


Figure 7-1. Basic ConnectReach Terminal Architecture

ConnectReach 200

Figure 7-2 on page 7-3 shows the *ConnectReach 200*, which is similar to the *ConnectReach* Terminal in that it is a multifeature voice and data integrated access device (IAD). The *ConnectReach 200* significantly reduces costs by combining voice, data, and Internet access into a single T1 line. The *ConnectReach 200* performs the functions of a DSU/CSU, channel bank, router, firewall, and much more. The *ConnectReach 200* is a single network device that simplifies configuration and network management by replacing more complex groups of components such as channel banks and routers.

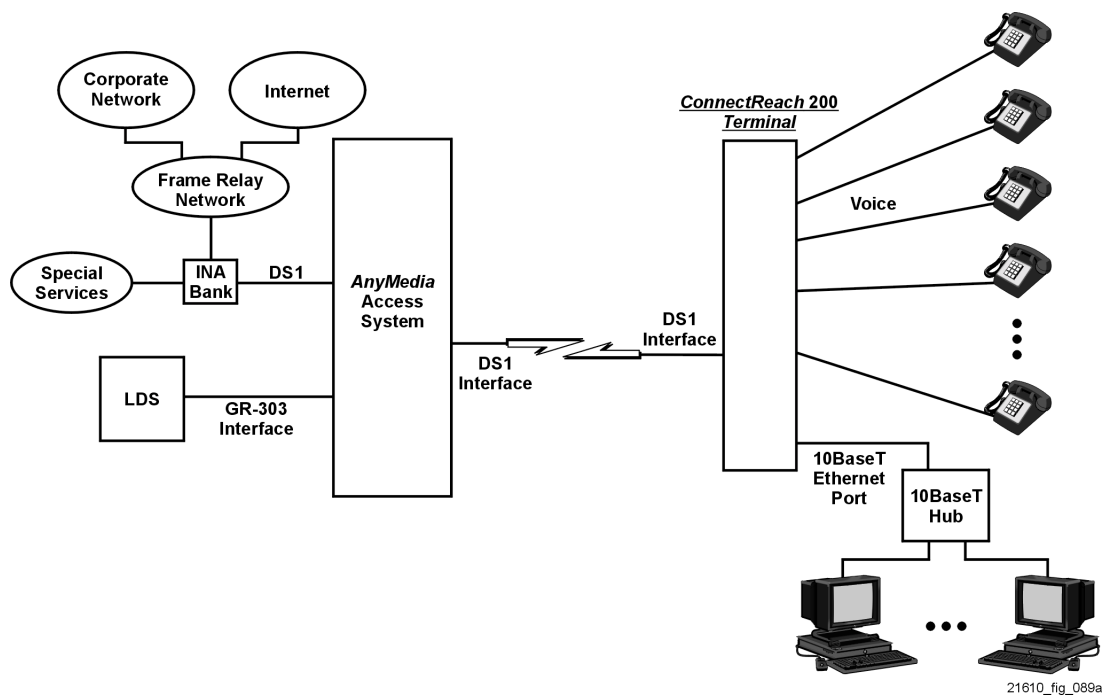


Figure 7-2. Basic ConnectReach 200 Architecture

Overview

This chapter describes the features and benefits of the *ConnectReach* Terminal and *ConnectReach* 200.

	<i>Page</i>
<i>Terminal Features</i>	8-2
<i>Terminal Benefits</i>	8-15

Terminal Features

Overview

The *ConnectReach* Terminal and *ConnectReach* 200 offer the following features:

- Switched telephone service
- Special services
- Built-in wide area network (WAN) to local area network (LAN) service router
- Mixed switched voice and digital data service
- Operations interfaces
- *ClearReach* feature.

Additionally, the *ConnectReach* Terminal offers the following features:

- *LCR* feature
 - *BOX* feature.
-

Switched telephone service

The *ConnectReach* Terminal and *ConnectReach* 200 support locally switched POTS and special service circuits through the *AnyMedia* Access System. Depending on the configuration chosen, the system can provide from 0 to 24 voice telephone lines. It allocates the bandwidth for POTS services — as well as all other services — in groups of four DS0s. For example, if only one phone line is provisioned from the system (one DS0), only 20 DS0s, instead of 23 DS0s, remain for use by other services.

As shown in Figure 8-1 on page 8-3, the *ConnectReach* Terminal and *ConnectReach* 200 multiplexes the DS0s supporting switched services into the network DS1 interfacing with the *AnyMedia* Access System. At the *AnyMedia* Access System, the switched DS0s are demultiplexed from the DS1 and routed to the LDS over a transport facility like a T1 carrier line or a SONET multiplexer.

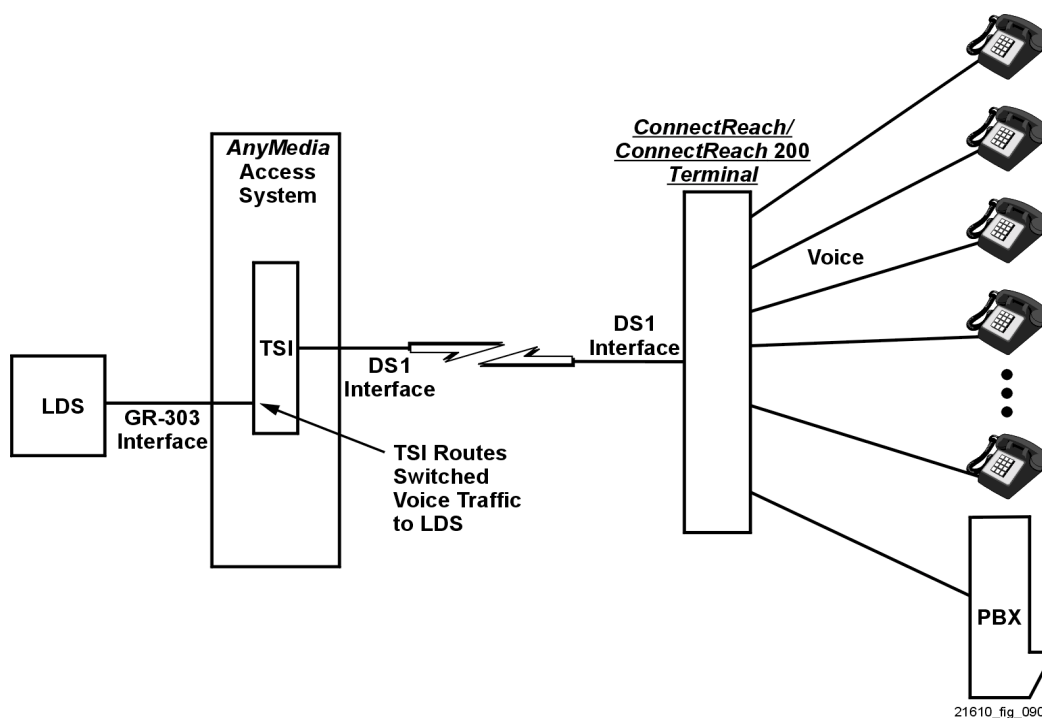


Figure 8-1. Switched Telephone Service

Special services

The *ConnectReach* Terminal and *ConnectReach* 200 support an assortment of special services at the customer location where both local lines and connection to a PBX is possible. The services include FX and DID connections. These services are transported to the *AnyMedia* Access System host RT, connected via a TSI to an INA digroup, and delivered to a serving location over the *AnyMedia* Access System transport network. Here they are terminated in an INA bank from which they are delivered to a special services port, shown in Figure 8-3 on page 8-6.

Built-in WAN to LAN service router

The *ConnectReach* Terminal and *ConnectReach* 200 support digital data traffic in 64 kbps increments (one DS0). Depending on the configuration chosen, the system can provide a bandwidth from 0 to 24 DS0s for these services. DS0s for digital data bandwidth are made available in blocks of four (see Note). The customer can provision the amount of bandwidth depending on their individual needs.

**NOTE:**

If a digital data bandwidth of only one DS0 is provisioned for a customer, the ability to provide other types of service from the *ConnectReach* Terminal and *ConnectReach* 200 is lost on the other three DS0s in the block of four DS0s (DS0 blocks refer to DS0 numbers 1 through 4, 5 through 8, etc.). However, any of the remaining three DS0s can be provisioned as data bandwidth in the future.

As shown in Figure 8-2 on page 8-4, computer or digital data traffic interfaces the 10BaseT Ethernet port on the system through a 10BaseT Ethernet hub. The *ConnectReach* Terminal and *ConnectReach* 200 then routes the traffic from this port onto the network DS1 interfacing with the *AnyMedia* Access System. At the *AnyMedia* Access System, the digital data bandwidth is demultiplexed from the DS1 interface and routed to an INA DS1 port by the TSI. The INA DS1 port interfaces both private and public networks through a frame relay network. Private networks may be a corporate digital data network, while a public network can be the Internet.

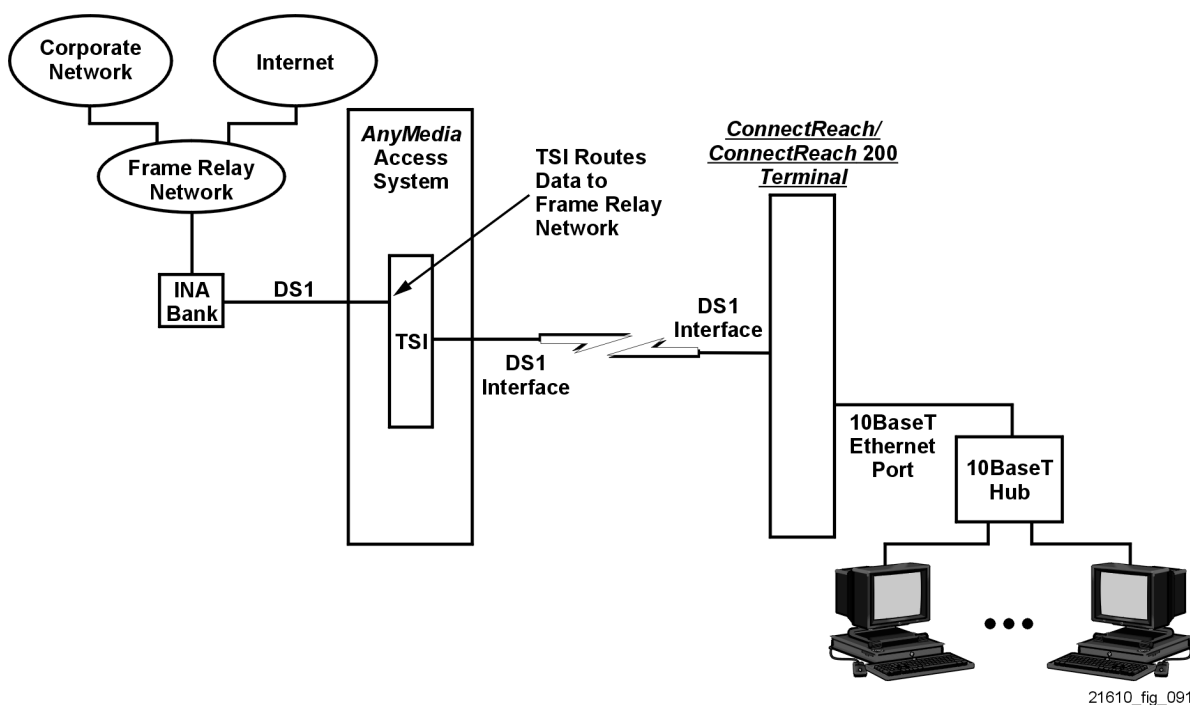


Figure 8-2. WAN to LAN Service Router

Because the *ConnectReach* Terminal and *ConnectReach* 200 can be used as a digital data router and firewall to the Internet or private corporate network, the following information must be configured in the *ConnectReach* Terminal and

ConnectReach 200 software (see the AnyMedia® Access System, *ConnectReach™ Terminal User's Guide* and the *ConnectReach 200 Series User's Guide*):

- Ethernet interface—This is the 10BaseT interface to the external LAN. To operate, configure the following:
 - *ConnectReach* Terminal and *ConnectReach* 200 IP address on the network on which it will be installed (or select IP unnumbered)
 - Netmask (if any) for the network on which the *ConnectReach* Terminal and *ConnectReach* 200 will be installed
 - 10BaseT link integrity testing.
- DHCP—The terminal uses DHCP to allocate IP addresses dynamically to devices on the network. If the site already has a DHCP server, or if each network device will be permanently assigned a unique IP address, it is not necessary to enable and configure DHCP on the *ConnectReach* Terminal and *ConnectReach* 200. If DHCP is used, configure the following:
 - IP address pool to be used at the site
 - Whether or not the site is considered a private network
 - Lease time of DHCP-allocated addresses
 - IP address of domain name service (DNS) server
 - Local site domain name.
- Route—The *ConnectReach* Terminal and *ConnectReach* 200 allow setting a default route and up to ten static routes. For ease of configuration, it is possible to specify a WAN or PVC number instead of an IP gateway address. For the default and each static route, specify the following:
 - Network IP address
 - Netmask
 - PVC or IP gateway.
- Firewall—The firewall allows the administrator control over who from the world-wide Internet can enter the LAN connected to the 10BaseT port. The *ConnectReach* Terminal and *ConnectReach* 200 allow the use of firewall technology, IP filtering.
- NTP—NTP obtains the time of day for time-stamping the event log messages.
- DNS proxy service—The *ConnectReach* Terminal uses DNS servers to resolve host names for internal commands such as ping and network upgrade. When enabling the DNS proxy service, specify the following:
 - IP address of the primary DNS server on the WAN/Internet
 - IP address of a secondary DNS server (if any) on the WAN/Internet.

Mixed switched voice and digital data service

As mentioned earlier, the *ConnectReach* Terminal and *ConnectReach* 200 allow multiplexing switched voice and digital data on the same DS1 interface. As shown in Figure 8-3 on page 8-6, by provisioning the *AnyMedia* Access System, the TSI in the *AnyMedia* Access System then normally routes the traffic to the assigned location. The *AnyMedia* Access System routes voice traffic to the LDS using a GR-303 interface. It routes digital data traffic to a frame relay network using an INA DS1 interface.

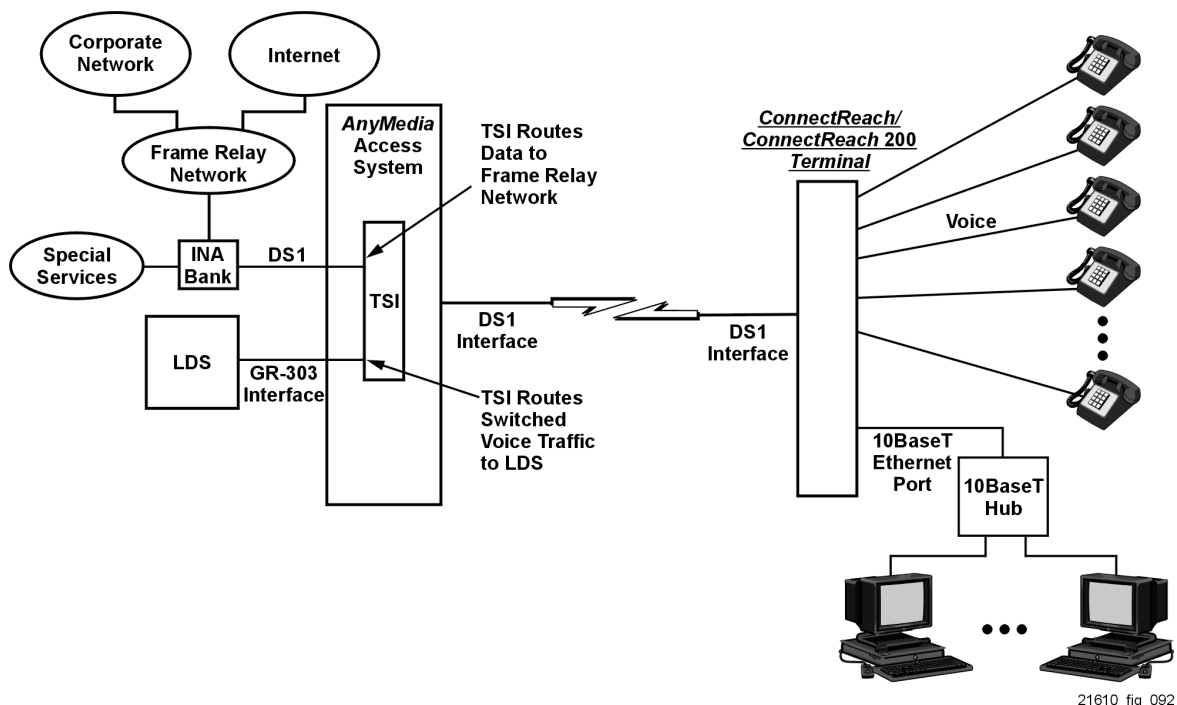


Figure 8-3. Mixed Traffic Containing Switched Voice and Digital Data

LCR feature in the *ConnectReach* Terminal

The *LCR* feature in the *ConnectReach* Terminal provides a variety of PBX-like or Centrex-like features at the customer location. The *LCR* feature allows the *ConnectReach* Terminal to route incoming or outgoing calls to customer-selectable destinations such as a CO switch. This allows for local call routing or least cost routing service. This feature can be used with or without the *BOX* feature. Outgoing calls originate only from a telecommunication device connected to a port on a CF circuit card. Incoming calls terminate only on a telecommunication device connected to a CF circuit card.

To use this feature, it must be configured in the software of the *ConnectReach* Terminal. The terminal must be equipped with a Telco DSP Processor option. See Chapter 10, *Product Description* for more information on these cards.

When using this feature, the terminal handles both preconfigured incoming and outgoing calls on preconfigured analog or digital trunk groups. Analog trunks always connect to a CS circuit card port. Digital DS0 trunks are multiplexed onto a DS1 signal connecting to the network DSX-1 interface. The *LCR* feature also supports a mixture of digital and analog trunks. However, the terminal will display a warning at the provisioning terminal when you choose this option. The terminal allows you to configure multiple trunk groups.

Outgoing trunk groups

The *LCR* feature allows preconfigured outgoing calls to be routed automatically to a preconfigured outgoing trunk group. By configuring the *ConnectReach* Terminal software, routing instructions to the trunk group are table driven or telephone number driven and depend on the number dialed and the availability of a trunk.

Following are the two types of outgoing trunks that can be configured for use with the *LCR* feature:

- Digital trunks—For example, a DS0 on the DSX-1 facility connecting the *ConnectReach* Terminal to the CO through the *AnyMedia* Access System.
- Analog trunks—For example, a voice frequency (VF) twisted pair that may connect to an analog switch port in the same CO that provides the DSX-1 facility or an analog switch port in another CO. At the *ConnectReach* Terminal, analog trunks must connect to a port on a CS circuit card.

Outgoing analog and digital trunks support both loop-start and ground-start signaling.

Incoming trunk groups

Both analog and digital incoming trunks can be configured for use with the *LCR* feature. Incoming trunks can support the following types of signaling options:

- Digital trunks:
 - E&M (incoming)
 - Loop-start
 - Ground-start.



NOTE:

In the *ConnectReach* Terminal, references to E&M signaling refer to a signaling type supported on DID trunks. It does not refer to the E&M signaling over metallic leads used with older transmission equipment.

- Analog trunks:
 - Loop-start
 - Ground-start.

The feature only supports DID on digital trunks provisioned for E&M signaling. DID is not supported on analog trunks. The telephone number of the incoming DID call controls the routing to a specific line or line group. Instructions from a software-configured routing table control the final destination of all other non-DID calls.

Two-way trunk groups

Both analog and digital two-way trunks can be configured for use with the *LCR* feature. Both analog and digital trunks can use either loop-start or ground-start signaling.

Service survival through call re-routing

One application of the *LCR* feature is to allow a connection to the LDS if there is a transmission failure between the *ConnectReach* Terminal and the *AnyMedia* Access System or between the *AnyMedia* Access System and its serving switch (Figure 8-4 on page 8-9). If a failure occurs, the customer can enter the dialing string to gain access to the LDS over the voice pair or the trunk group of voice pairs.

It also can allow a connection between the *ConnectReach* Terminal and a different CO switch than the switch normally serving the system through the *AnyMedia* Access System. An application of this feature may be local 911 service. As shown in Figure 8-5 on page 8-10, if the *ConnectReach* Terminal is not in the same local area as the switch, the *LCR* feature can allow a voice pair or trunk group to be connected to a local switch. The feature allows provisioning the terminal to recognize the dialed digits 9-1-1 and routing the call to a voice pair or trunk group connected to the local switch. During an emergency, this will allow a user on the *ConnectReach* Terminal to call the local 911 system.

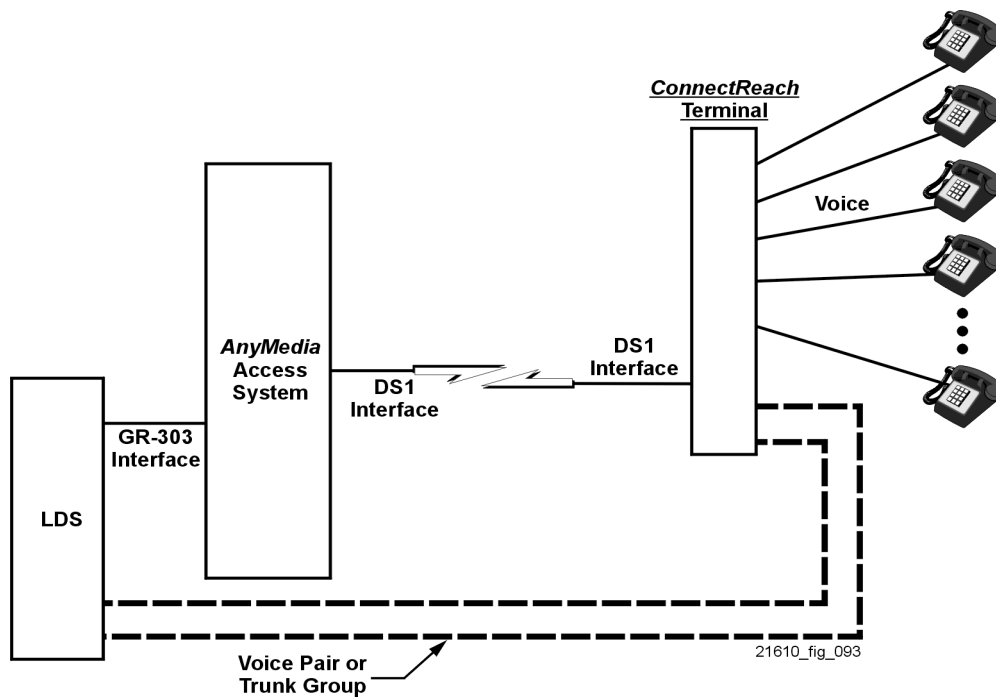


Figure 8-4. LCR Feature Using a Voice Pair or Trunk Group for Protection

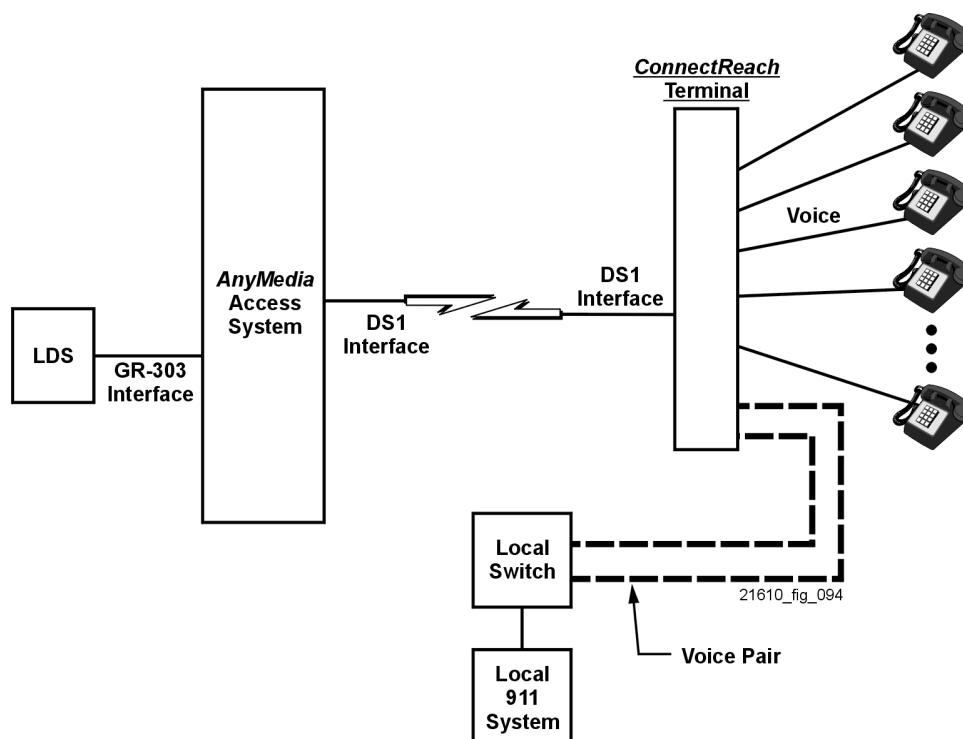


Figure 8-5. LCR Feature Used to Connect to a Local Switch

BOX feature in the ConnectReach Terminal

The *BOX* feature allows the *ConnectReach* Terminal to provide enhanced call management features similar to a Centrex system offered by a CO switch. However, there is no need for dedicated lines to the CO for each extension.

The *BOX* feature requires the *LCR* feature. Both features must be configured in the *ConnectReach* Terminal software. This feature also requires the Telco DSP Processor hardware option. When configured for *BOX* service, the *ConnectReach* Terminal offers the following features for the telephone sets connected to the voice ports:

- Transferring a call to another phone—By flashing the switchhook, a secondary dial tone is received that allows dialing the number of another line and transferring the call. If there is no answer, the user can flash the switchhook to return to the first party. This same procedure works from a line on the *ConnectReach* Terminal to an “outside” line. However, it is not possible to transfer an outside line to another outside line if both lines use loop-start signaling. An attempt to do this will result in the user hearing a fast busy tone. At this point, the user can flash the switchhook once to reestablish the connection with the other party.

- Consultation hold—This feature allows alternating between two separate parties. If any one of the three parties hangs up, the remaining two parties retain their connection. One, but not both, of the parties may be connected from a loop-start trunk.
- Three-way calling—This feature allows adding a third party to a conversation. If any one of the three parties hangs up, the remaining two parties retain their connection. One, but not both, of the parties may be connected from a loop-start trunk.
- Call waiting—When a call is received while the phone is in use, the user can flash the switchhook once to answer the incoming call. Then the user may use the consultation hold feature to alternate between calls. This feature is incompatible with the call forward feature.
- Call pickup group—A user may answer a call on a different line in the same call pickup group by dialing a feature code. If multiple lines in a call pickup group are ringing, only one of them is answered on each pickup attempt. If no line is ringing when the feature code is dialed, a fast busy tone is heard.
- Call forward—This feature allows forwarding calls to another extension or outside number. If the incoming call is from a loop-start trunk, it cannot be forwarded to an outside line on a loop-start trunk.
- Pager—This feature allows for paging capability by dialing the pager feature code. A commercial off-the-shelf product is used for the paging amplifier.
- Busy redial—This feature is used when a line is giving a busy signal when dialing another line or when seizing an outgoing trunk. When the busy line becomes free, the calling line receives a distinctive ring. For a trunk call, the called party's digits are remembered and redialed. If the caller does not answer within six rings, the feature is canceled.
- Distinctive ring—This feature allows incoming calls to be distinguished from local intercom calls. The distinctive ring is a double ring (half second on, one second off, half second on, four seconds off—need to check this for compatibility with analog caller ID). A call from an outside trunk transferred by an inside line is rung as an outside call.
- External voice mail—The *BOX* features can communicate with an external voice mail system using DTMF inband signaling. Typically, the voice mail system is located near the *ConnectReach* Terminal and interfaces through CF circuit card port(s). One or more lines can be dedicated to the physical voice mail ports. Any one of the following five preset voice mail system profiles can be chosen:
 - Generic
 - BBS Telecom
 - Panasonic TD1232
 - Toshiba Dk280
 - Samsung DCS.

The *ConnectReach* Terminal can be configured to forward incoming trunk calls to a voice mail system providing auto-attendant functions.

***ConnectReach*
terminal and
ConnectReach 200
OAM&P access**

Access methods

The *ConnectReach* Terminal and *ConnectReach* 200 can be accessed and provisioned using the following methods:

- Local ports (RS-232, 10BaseT) on the *ConnectReach* Terminal and *ConnectReach* 200
- *AnyMedia* OAM&P interfaces (CIT, LAN, ROC) using the *ConnectReach* Terminal and *ConnectReach* 200 DS1 ESF facility data link
- The *AnyMedia* DS1 facility that is cross-connected to the *ConnectReach* Terminal and *ConnectReach* 200 using one or more groups of four DS0 channels provisioned as clear channels. This method is available only when the *ConnectReach* Terminal and *ConnectReach* 200 are configured for data or for data and VF services.

When using local *ConnectReach* Terminal and *ConnectReach* 200 port access, *ConnectReach* Terminal and *ConnectReach* 200 DS1 connection to the *AnyMedia* Access System is not required. When using an access method other than local, *ConnectReach* Terminal and *ConnectReach* 200 DS1 connection to the *AnyMedia* Access System must be established.

Local port access on *ConnectReach* Terminal and *ConnectReach* 200

When using local ports on the *ConnectReach* Terminal and *ConnectReach* 200, there are three ways to access the terminal:

- RS-232 port using a null modem cable from a terminal with a terminal emulation program (e.g., TeraTerm, Procomm)
- RS-232 port attached through a standard serial cable to a modem, which is connected to a POTS line. This line is used for dial-up access from a remote computer with a modem.
- 10BaseT port using an Ethernet crossover cable from a directly connected computer or a straight through Ethernet cable from an Ethernet hub.

The default settings to use for the RS-232 connection are:

- 9600 baud
- 8 data bits
- 1 stop bit
- no parity
- hardware flow control.

The default IP address settings for the 10Base T connection are 192.168.0.1 with a subnet mask of 255.255.255.0. Therefore, the computer's IP address must be on the same subnet (e.g., 192.168.0.2).

***AnyMedia* OAM&P interface access**

When using the *AnyMedia* OAM&P interfaces, refer to *Operations Interfaces* in the *AnyMedia*® Access System, *Applications, Planning, and Ordering Guide*.

***AnyMedia* DS1 facility with data configuration access**

When using a DS1 facility with data configuration, refer to Figure 8-6 on page 8-13 for a typical interconnection using this access method. This method allows access to a *ConnectReach* Terminal and *ConnectReach* 200 from the DCN.

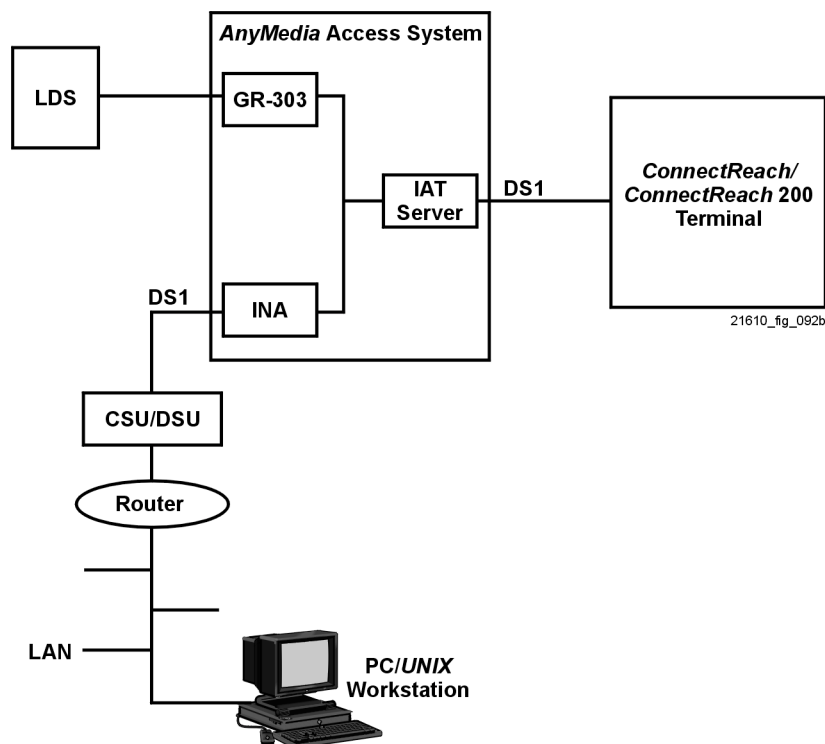


Figure 8-6. Interconnection Using a DS1 Facility with Data Configuration

***ClearReach* feature**

When hosted from an *AnyMedia* Access System RT, which is in turn hosted from a Lucent 5ESS GR-303 LDS, the *ConnectReach* Terminal and *ConnectReach* 200 offer the *ClearReach* feature. *ClearReach* provides enhanced modem performance by providing a 64 kbps clear channel between the

ConnectReach Terminal and *ConnectReach* 200 and the LDS. *ClearReach* is available on locally switched GR-303 lines with the following GSFNs: DFLT, 2LS, 2GS. The *ClearReach* feature is also called voice frequency data enhancement (VFDE).

**NOTE:**

When the *ClearReach* feature is enabled in the *ConnectReach* Terminal, the *LCR* and *BOX* features are unavailable (disabled). When the *LCR* and *BOX* features are enabled in the *ConnectReach* Terminal, the *ClearReach* feature is turned off.

Terminal Benefits

Overview

The *ConnectReach* Terminal and *ConnectReach* 200 offer many benefits, including the following:

- Cost savings
 - Flexibility
 - Bandwidth allocation
 - *FAST* shelf interface
 - Comprehensive OAM&P.
-

Cost savings

By combining voice and digital data services in the DS1 signal connected to the *ConnectReach* Terminal's and *ConnectReach* 200's network DSX-1 interface for all communications applications, the cost of access is significantly lower than leasing individual analog or voice lines or switched 56- or 64-kbps lines. Costs are reduced by eliminating costly hardware components such as channel banks, DCS-type equipment, multiplexers, and routers.

Flexibility

The *ConnectReach* Terminal and *ConnectReach* 200 allow bandwidth to be configured to meet the particular needs of a business as it grows. For example, for faster Internet service or more phone lines, a DS0 channel can be added remotely with a simple software configuration change instead of a costly on-site visit from a phone company technician.

Bandwidth allocation

The *ConnectReach* Terminal and *ConnectReach* 200 can allocate resources (DS0 channels) for bandwidth intensive applications using a full DS1 capacity. The customer chooses how many DS0s of the DS1 facility are allocated to each desired service type. This allows for the efficient use of the DS1 bandwidth for voice while increasing the bandwidth of data and Internet applications. The DS1 signal interfacing the *ConnectReach* Terminal and *ConnectReach* 200 allows sufficient bandwidth for multiple simultaneous applications along with enhancing access to the Internet.

FAST shelf interface

Services provided by the *ConnectReach* Terminal and *ConnectReach* 200 interface the switched voice, special services, and data networks through a *FAST* shelf. Interfacing through the *FAST* shelf provides the following advantages:

- DCS-type capabilities—Using its TSI, the *FAST* shelf provides a DCS-type capability. DS0s configured for data or special services can be mapped to a frame relay network over an INA DS1. DS0s configured for switched telephony can be mapped through a GR-303 LDS interface.
 - GR-303 LDS interface—The *FAST* shelf's GR-303 interface allows the *ConnectReach* Terminal and *ConnectReach* 200 to interface with the LDS using a high line concentration ratio, thus providing an efficient DS1 interface to the LDS. This can produce significant cost savings for a network.
 - Very high line density—The *FAST* shelf can host up to 80 *ConnectReach* Terminal and *ConnectReach* 200, thus efficiently handling up to 1920 lines. Grooming the lines from multiple *ConnectReach* Terminal and *ConnectReach* 200 onto INA DS1s and GR-303 VRTs makes the most efficient use of the transport DS1s.
-

Overview

This chapter discusses the basic *ConnectReach* Terminal and *ConnectReach* 200 applications supported by Lucent Technologies as well as the basic network interfaces between the *ConnectReach* Terminal and *ConnectReach* 200 and the *AnyMedia* Access System. In addition, some of the more common applications for connecting the *AnyMedia* Access System to the *ConnectReach* Terminal and *ConnectReach* 200 are described. This chapter also describes the services provided by the *ConnectReach* Terminal and *ConnectReach* 200 applications.

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Basic *ConnectReach* Terminal and *ConnectReach* 200 Applications

Overview

This section describes the basic *ConnectReach* Terminal and *ConnectReach* 200 applications supported by the *AnyMedia* Access System. Although many different customized applications are possible, most are based on the basic applications described in this section.

Terms

The following terms are used in describing the applications:

- **Metallic VF lines**—This term refers to lines terminating on a CF circuit card through the VOICE CHANNELS port of the *ConnectReach* Terminal and *ConnectReach* 200 applications. These lines usually provide services such as POTS services or switched special services. Sometimes it is referred to as the channel bank mode. At the *AnyMedia* Access System, these services usually are routed to a GR-303 interface.
 - **Digital data**—This term refers to services interfacing the *ConnectReach* Terminal and *ConnectReach* 200 applications through the 10BaseT port. It usually consists of a connection from an external 10BaseT Ethernet hub. This external hub provides the interface for data equipment, such as computer terminals, to data networks, such as the Internet and/or a private corporate network. At the *AnyMedia* Access System, these services are usually routed to an INA DS1 interface.
 - **Secondary T1/DSX-1**—This term refers to connections through the secondary T1 LINE port of the *ConnectReach* Terminal applications. The secondary T1/DSX-1 connection usually provides services such as digital lines to an external PBX or key system. It requires the use of the fractional T1 circuit card or the fractional T1/DSP processor combination card (*ConnectReach* Terminal application only).
 - **Metallic VF lines with LCR feature**—This term refers to metallic VF lines as described previously in a system containing the optional LCR feature (Chapter 8, *Features and Benefits* describes the LCR feature). (*ConnectReach* Terminal application only.)
 - **BOX feature**—This term refers to a *ConnectReach* Terminal application provisioned for the PBX-type services known as the BOX feature (Chapter 8, *Features and Benefits* describes the BOX feature). (*ConnectReach* Terminal application only.)
-

Basic applications

The basic *ConnectReach* Terminal and *ConnectReach* 200 applications, which includes two base systems and several applications built from those base systems, are listed below:

Base systems

- Metallic VF lines only base system
- Metallic VF lines and data base system.

Enhanced applications for ConnectReach Terminal only

The following four enhancements on the base systems are possible:

- Metallic VF lines, data, and secondary T1/DSX-1 application
- Metallic VF lines, data, and *LCR* feature application
- Metallic VF lines, data, secondary T1/DSX-1, and *LCR* feature application
- Metallic VF lines, data, and *BOX* feature application

In these systems and applications, the term “data” refers to 64 kbps clear channel digital data service.

Building basic applications from base systems

The basic *ConnectReach* Terminal and *ConnectReach* 200 applications can be built from one of the following base systems:

- Metallic VF lines only base system
- Metallic VF lines and data base system.

See the AnyMedia® Access System, *Ordering Guide* for details on ordering the base systems and for details on ordering hardware and software for the desired enhancements. Also see the AnyMedia® Access System, *ConnectReach™ Terminal User's Guide* and the AnyMedia® Access System, *ConnectReach™ 200 User's Guide* for more detail on the base systems and their enhancements.

The following sections describe the necessary equipment for both the base systems and the enhanced applications built from the base systems.

The *LCR* and *BOX* features require equipping the *ConnectReach* Terminal application with the DSP card.

Different software loads can be added — such as SW-B*, SW-D*, *LCR* software, *BOX* software, etc. — by obtaining feature keys that consist of an access code. These key codes can be used to provision the specific software into the system. To obtain these key codes, contact the Lucent Technologies Sales

* Optional in *ConnectReach* Terminal; for details, see the AnyMedia® Access System, *ConnectReach™ Terminal User's Guide*

Representative. These features also can be ordered installed with the product (for details, see the AnyMedia® Access System, *Ordering Guide*).

Metallic VF Lines Only Base System

Overview

As shown in Figure 9-1, this base system provides metallic VF lines only service. It does not provide other services such as digital data or secondary T1/DSX-1. When initially obtained, the system contains the necessary hardware and software to provide metallic VF lines only service.

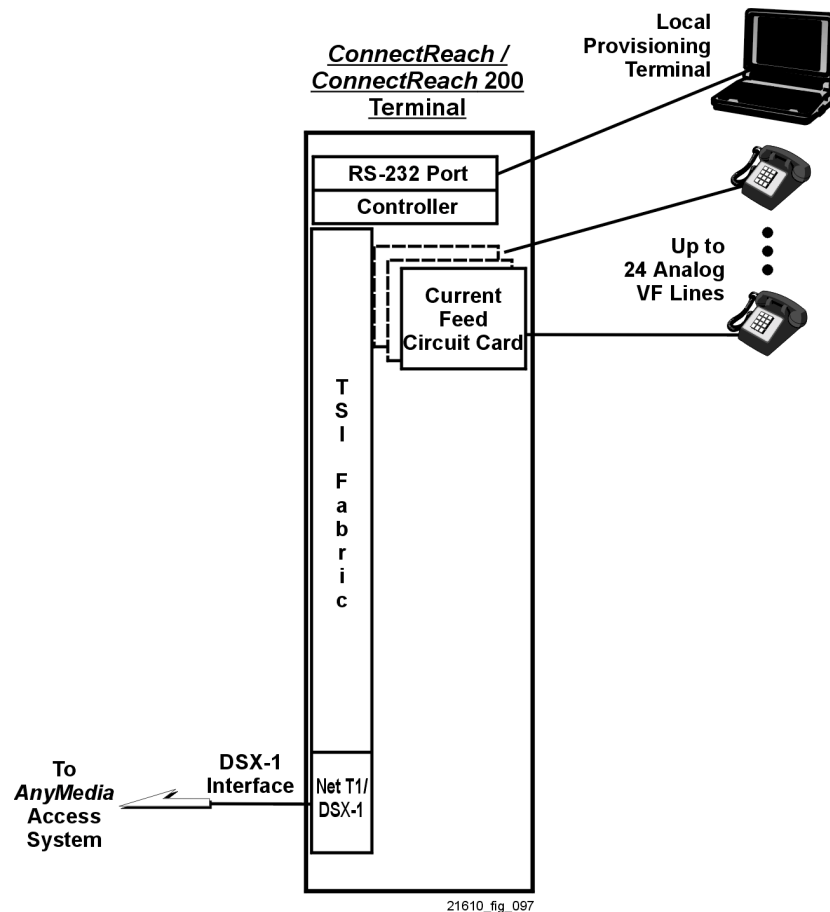


Figure 9-1. Metallic VF Lines Only Base System

Equipment required

The following equipment is required to obtain the services provided by the metallic VF lines only base system:

- Base system with software support for VF lines only
- Choice of either AC or DC powering

- CF circuit cards to provide up to 24 VF lines.

**NOTE:**

The base system provides one 8-line CF circuit card to support eight VF lines. If additional lines are needed, obtain additional 4-line cards or 8-line cards. The system can contain a maximum of three CF circuit cards.

Metallic VF Lines and Data Base System

Overview

As shown in Figure 9-2, this base system provides metallic VF lines and digital data service.



NOTE:

Although each base system comes with the capability of providing 24 metallic VF lines or a digital data bandwidth of 24 DS0s, the metallic VF lines and data base system assumes at least one metallic VF line and a digital data bandwidth of at least one DS0. However, the combined bandwidth of both services cannot exceed 24 DS0s.

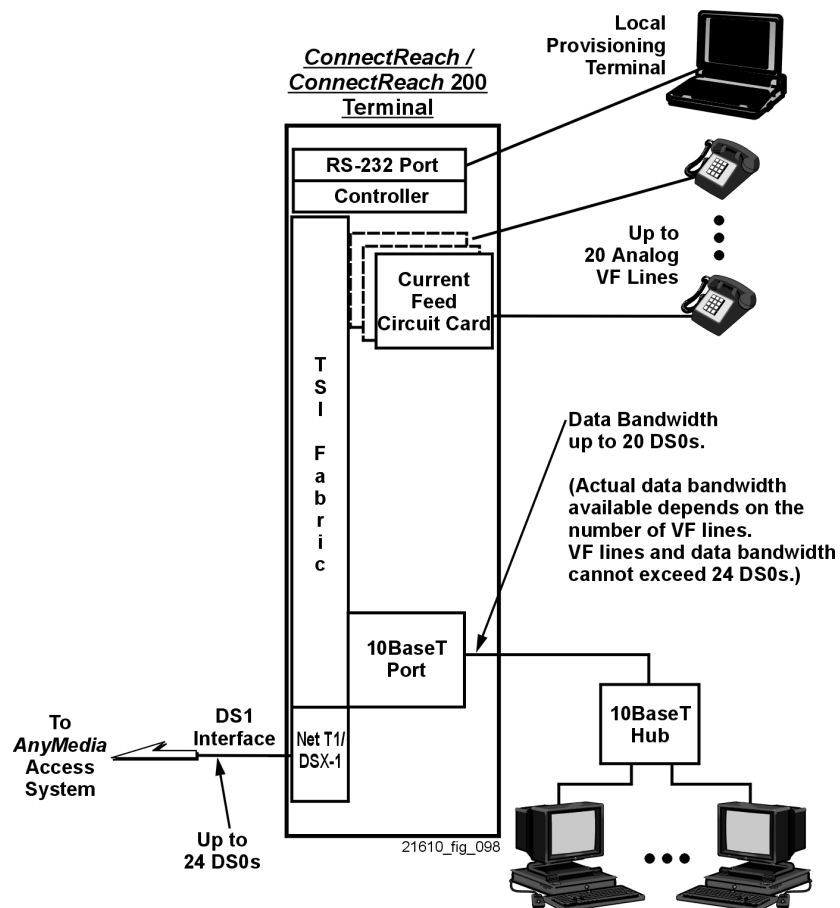


Figure 9-2. Metallic VF Lines and Data Base System

Determine customer's needs

To decide which of the equipment to obtain, determine the following based on the customer's needs:

- Type of power (AC or DC power)
- The number of metallic VF lines required (up to 20 lines)
- The number of DS0s required to provide the digital data bandwidth (minimum of one DS0; maximum of 20 DS0s — see Note below).

As shown in Figure 9-2 on page 9-7, if DS0s are allocated for each service, the maximum number of VF lines is 20. Also, the maximum DS0 bandwidth for digital data is 20. This is because DS0s are made available in blocks of four (see Note below). Total bandwidth for both services cannot exceed 24 DS0s.

**NOTE:**

If a digital data bandwidth of only one DS0 is provisioned for the customer, the ability to provide other types of service from the *ConnectReach* Terminal and *ConnectReach* 200 on the other three DS0s in the block of four DS0s is lost. However, any of the remaining three DS0s can be provisioned as digital data bandwidth in the future.

When initially obtained as described above, the configuration contains the necessary hardware and software to provide metallic VF line and digital data services.

Equipment required For *ConnectReach* Terminal

One of the following base system types is required to obtain the services desired:

- AC powered; less than 16 metallic VF lines
 - Base system—This base system type includes all necessary software for digital data services, but does not include CF circuit cards for metallic VF line services.
 - CF circuit cards—Up to three cards (8-line card, 4-line card).
- AC powered; 16 or more metallic VF lines
 - Base system—This base system type includes all necessary software for digital data services and also includes two 8-line CF circuit cards for metallic VF line services.
 - Additional CF circuit cards—This base system type includes two 8-line cards. For additional lines, an additional 8-line card or 4-line card can be ordered.
- DC powered:
 - Base system—This base system type includes all necessary software for digital data services, but does not include CF circuit cards for metallic VF line services.

- CF circuit cards—Up to three cards (a combination of 8-line cards or 4-line cards).

For *ConnectReach* 200 Series

In order to initially configure the *ConnectReach* 200, you will need the following:

- A *ConnectReach* 200 unit with a 120V AC to 20V AC transformer, or access to 20V AC or 24V DC power.
- A computer equipped with a terminal emulation application for null modem or dial up modem connections. This can be an *IBM* compatible personal computer (PC) running an application such as Procomm or TeraTerm, or a *UNIX* workstation running *tip*, or any computer running a similar application. Alternatively, a Telnet or HTTP session may be initiated through the Ethernet connection using a Telnet terminal window or Web browser.
- A connection between the *ConnectReach* 200 and a computer terminal. This may be accomplished in one of the following ways:
 - A modem and cable for remote connection.
 - A null modem cable to connect to the serial port of a local computer terminal.
 - An Ethernet cross-over cable (or regular cables with the Ethernet hub) to connect to the Ethernet port on a computer equipped with an Ethernet card (required only when a PC is being connected to *ConnectReach* 200 10BaseT port). The *ConnectReach* 200 Ethernet port operates in half-duplex transmission mode.

See the AnyMedia® Access System, *Ordering Guide* for more detailed information.

Metallic VF Lines, Data, and Secondary T1/DSX-1 Application for *ConnectReach* Terminal Only

Overview

As shown in Figure 9-3, this application provides metallic VF lines, digital data, and secondary T1/DSX-1 service (for *ConnectReach* Terminal only). To determine the equipment needed for this application, build the system from the base system for the *ConnectReach* Terminal that includes both VF and data capability.

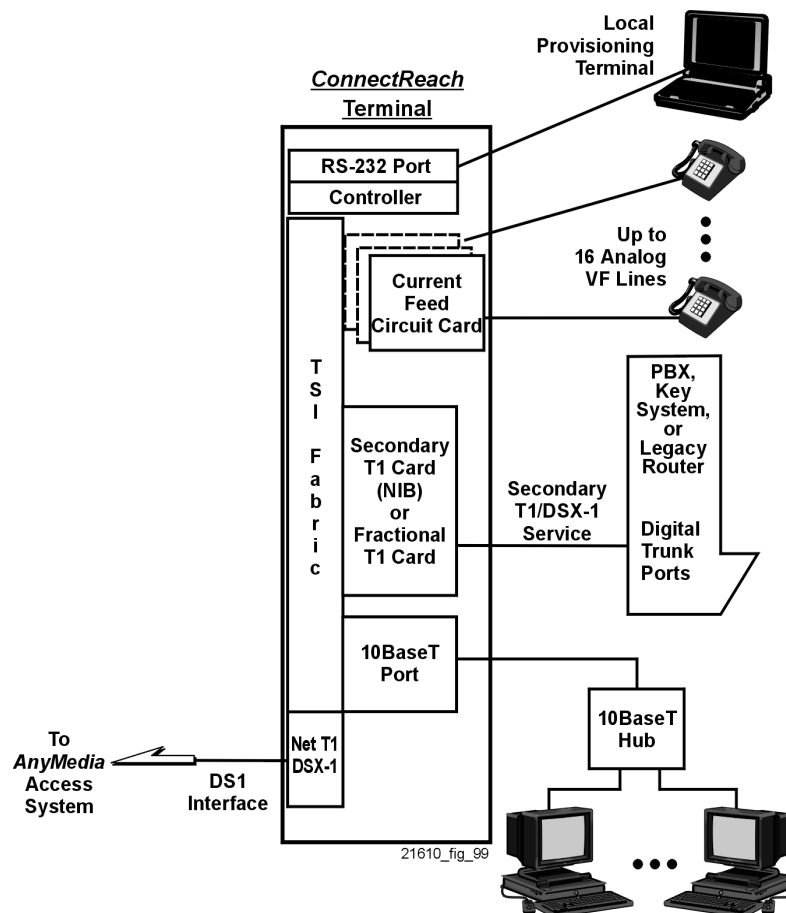


Figure 9-3. Metallic VF Lines, Data, and Secondary T1/DSX-1 Application

Determine customer's needs

To decide which metallic VF lines and data base system to obtain and the DS0 bandwidth needed for the application, determine the following based on the customer's needs:

- Type of power (AC or DC power)
- The number of metallic VF lines required
- The number of DS0s required to provide the digital data bandwidth
- The number of DS0s required for secondary T1/DSX-1 service.

Total bandwidth for all services cannot exceed 24 DS0s. If DS0s are allocated for each service, the maximum number of VF lines is 16 (two eight-line FXS cards). This is because DS0s are made available in blocks of four (see Note below).



NOTE:

Lines and DS0s are assigned in groups of four. If a digital data bandwidth of only one DS0 is provisioned for the customer, the ability to provide other types of service from the *ConnectReach* Terminal or *ConnectReach 200* on the other three DS0s is lost in the block of four DS0s. However, it is possible to provision any of the remaining three DS0s as digital data bandwidth in the future.

Metallic VF Lines, Data, and *LCR* Feature Application for *ConnectReach* Terminal Only

Overview

As shown in Figure 9-4, this application provides metallic VF lines, digital data, and *LCR* feature service. To determine the equipment needed for this application, build the system from the base system for the *ConnectReach* Terminal that includes both VF and digital data capability.

The *ConnectReach* Terminal must be equipped with a DSP card and *LCR* software.

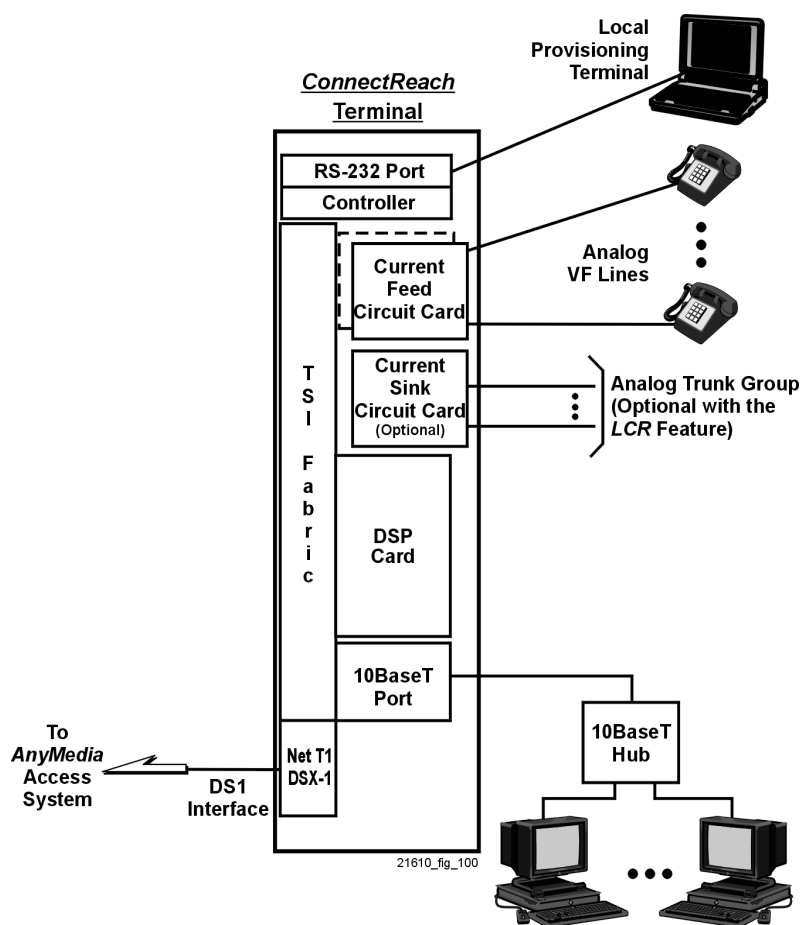


Figure 9-4. Metallic VF Lines, Data, and *LCR* Feature Application

**Determine
customer's needs**

To decide which metallic VF lines and data base system to obtain and the DS0 bandwidth needed for the application, determine the following based on the customer's needs:

- Type of power (AC or DC power)
- The number of metallic VF lines required and whether the *LCR* feature will use outgoing analog circuits or trunk groups



NOTE:

If the *LCR* feature requires an outgoing analog line or trunk group, at least one of the three circuit cards must be a CS circuit card (FXO). The system can contain only a maximum combination of three CF and/or CS cards.

- The number of DS0s required to provide the digital data bandwidth (minimum of one DS0).

DS0s are made available in blocks of four. Total bandwidth for all services cannot exceed 24 DS0s.

Metallic VF Lines, Data, Secondary T1/DSX-1, and *LCR* Feature Application for *ConnectReach* Terminal only

Overview

A *ConnectReach* application is shown in Figure 9-5. This application provides metallic VF lines, digital data, secondary T1/DSX-1, and *LCR* feature service. To determine the equipment needed for this application, build the system from the base system for the *ConnectReach* Terminal that includes both VF and digital data capability.

The *ConnectReach* Terminal must be equipped with a fractional T1/DSP combination card and *LCR* software.

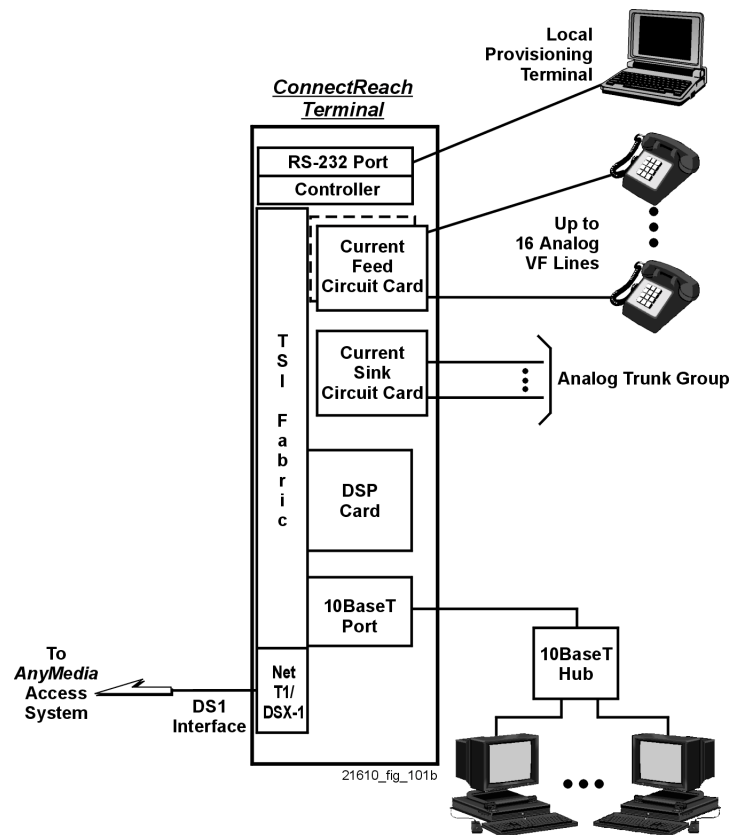


Figure 9-5. Metallic VF Lines, Data, Secondary T1/DSX-1, and *LCR* Feature Application for the *ConnectReach* Terminal

**Determine
customer's needs**

To decide which metallic VF lines and data base system to obtain and the DS0 bandwidth needed for the application, determine the following based on the customer's needs:

- Type of power (AC or DC power)
- The number of metallic VF lines required and whether the *LCR* feature will use outgoing analog circuits or trunk groups.



NOTE:

If the *LCR* feature requires an outgoing analog line or trunk group, at least one of the three circuit cards must be a CS circuit card (FXO). The system can contain only a maximum combination of three CF and/or CS cards.

- The number of DS0s on the secondary T1/DSX-1
- The number of DS0s required to provide digital data bandwidth.

Total bandwidth for all three services cannot exceed 24 DS0s.

Metallic VF Lines, Data, and *BOX* Feature Application for *ConnectReach* Terminal Only

Overview

A *ConnectReach* Terminal application is shown in Figure 9-6. This application provides metallic VF lines, digital data, and *BOX* feature service. To determine the equipment needed for this application, build the system from the base system for the *ConnectReach* Terminal that includes both VF and digital data capability.

The *ConnectReach* Terminal must be equipped with a DSP card and *BOX* software.

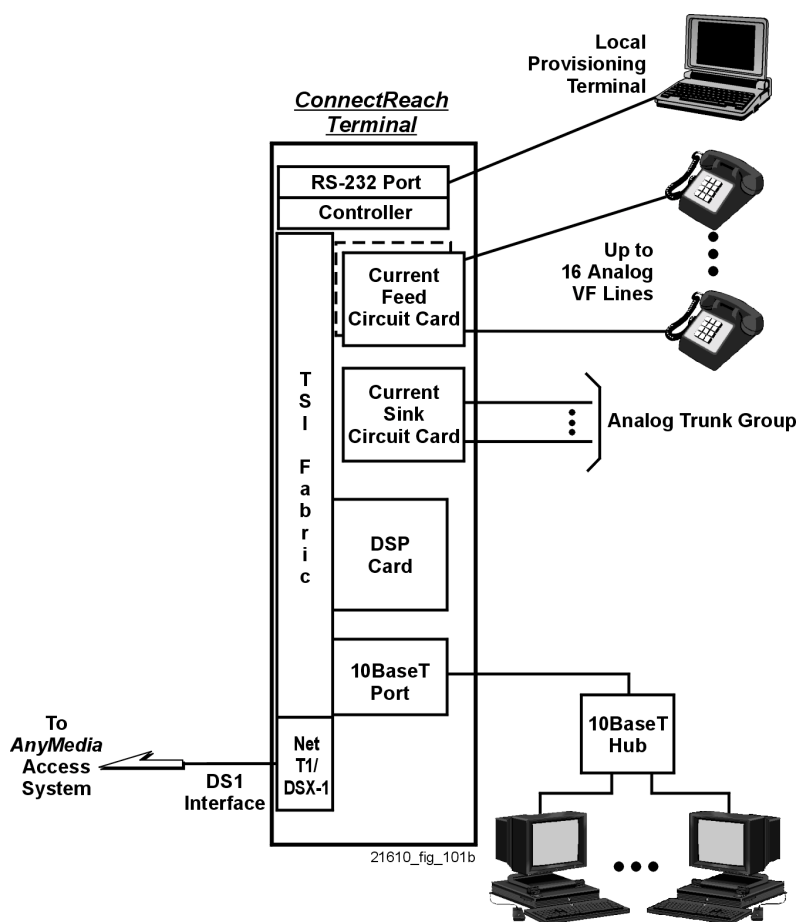


Figure 9-6. Metallic VF Lines, Data, and *BOX* Feature Application for the *ConnectReach* Terminal

**Determine
customer's needs**

To decide which of the above equipment to obtain, determine the following based on the customer's needs:

- Type of power (AC or DC power)
- The number of metallic VF lines required and whether the *BOX* feature will use outgoing analog circuits or trunk groups



NOTE:

If the *BOX* feature requires an outgoing analog line or trunk group, at least one of the three circuit cards must be a CS circuit card (FXO). The system can contain only a maximum combination of three CF and/or CS cards.

- The number of DS0s required to provide the digital data bandwidth.

Total bandwidth for all services cannot exceed 24 DS0s.

Networking Applications

Basic network interfaces

The basic network interface for the *ConnectReach* and *ConnectReach 200* applications is a DSX-1 interface carrying a standard 1.544 MBps DS1 signal with 24 64 kbps DS0s. The DSX-1 interface allows for the following network connections between the *ConnectReach* Terminal or *ConnectReach 200* and the *FAST* shelf:

- T1 carrier line
- Optical multiplexer with a DSX-1 interface
- Radio carrier system with a DSX-1 interface.

The *ConnectReach* Terminal or *ConnectReach 200* must be located within 655 feet (22-gauge wire) of a DSX cross-connect connected to the electrical or optical carrier system interfacing with the *FAST* shelf. If the *ConnectReach* Terminal or *ConnectReach 200* is collocated with the *FAST* shelf, they each must be within 655 feet of a DSX cross-connect or the equipment connecting them.

At the *FAST* shelf, an IAT Server must be provided. If collocated transmission equipment is used, the *FAST* shelf also must be within 655 feet (22-gauge wire) of the collocated equipment or a DSX cross-connect.

T1 carrier system application

Figure 9-7 on page 9-19 shows the basic application for connecting a *ConnectReach* Terminal or *ConnectReach 200* with the *FAST* shelf using a T1 carrier system. Each T1 carrier line contains one DS1 signal.

At the *FAST* shelf, the T1 carrier system interfaces the IAT Server in the *AnyMedia* Access System through a DSX cross-connect. The IAT Server does not contain a built-in T1 interface.

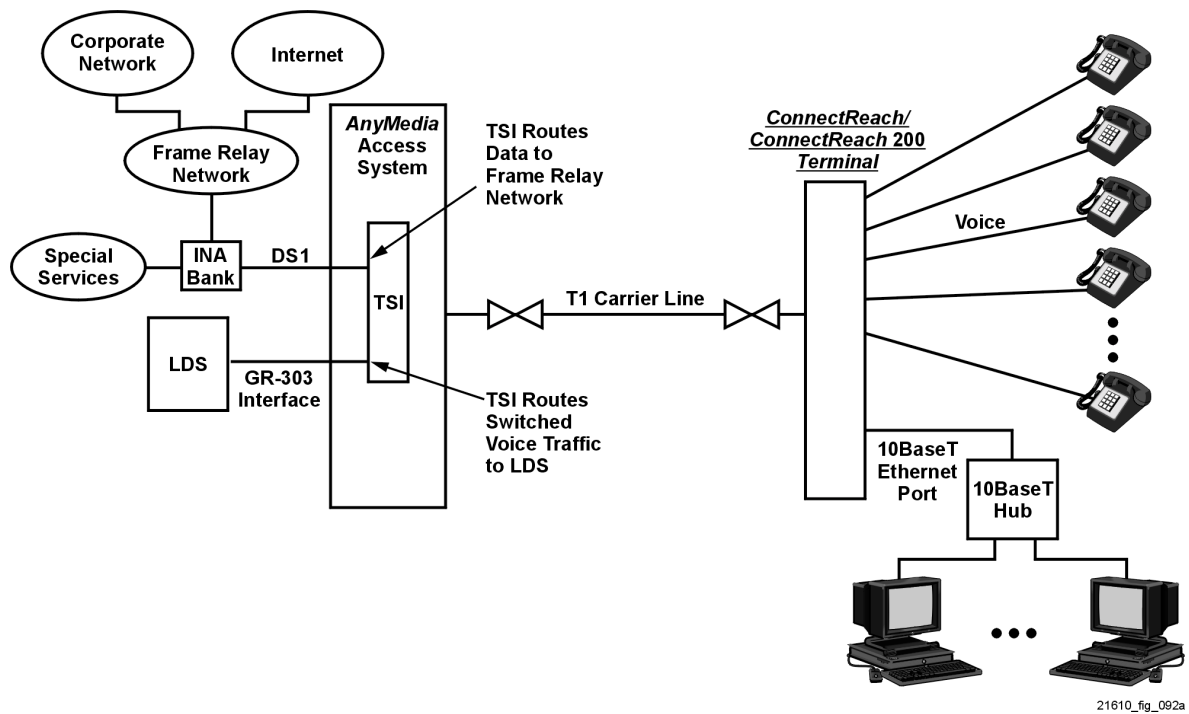


Figure 9-7. Network Connection—T1 Carrier System

SONET optical multiplexer application example

The *AnyMedia* Access System can host a *ConnectReach* Terminal or *ConnectReach 200* through a SONET ring using an optical multiplexer. Each ring can carry up to 28 DS1s (OC-1) or 84 DS1s (OC-3) to the *ConnectReach* Terminal or *ConnectReach 200* from the servers installed in the *FAST* shelf. An external DDM-2000 multiplexer must host the wideband shelves in the ring.

Figure 9-8 on page 9-20 shows an *AnyMedia* Access System hosting *ConnectReach* Terminal or *ConnectReach 200* through a collocated an optical multiplexer.

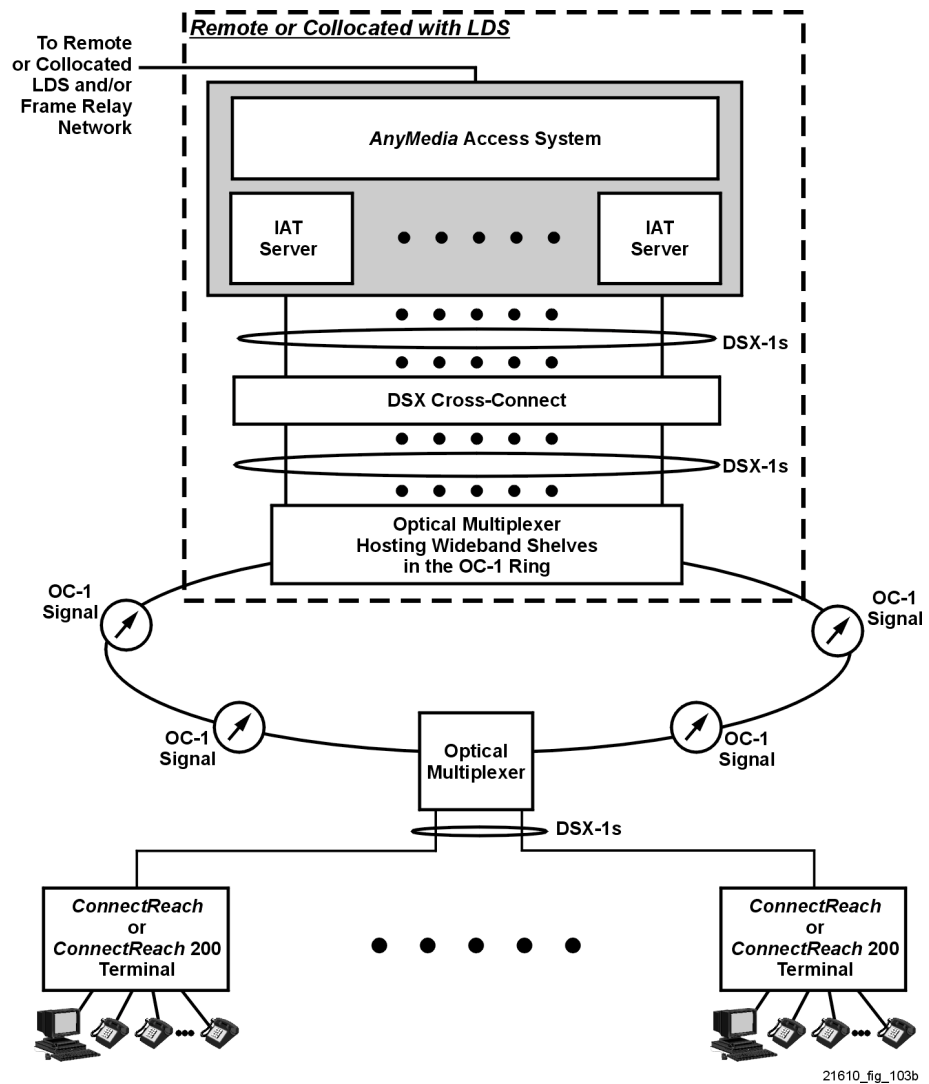


Figure 9-8. AnyMedia Access System Hosting ConnectReach Terminal or ConnectReach 200 Through an Optical Multiplexer

ConnectReach Terminal and ConnectReach 200 Services

Overview

The *ConnectReach* Terminal or *ConnectReach* 200 provide up to 24 DS0s for a variety of voice-grade and digital data services. Most voice-grade services interface with the *ConnectReach* Terminal or *ConnectReach* 200 through either a CF or CS circuit card. The DS0s containing the voice-grade services interface with the *FAST* shelf through the network DSX-1 port. At the *FAST* shelf, the voice-grade services are routed to a GR-303 interface of a switch.

These services include the following:

- Analog VF POTS service
- Locally switched special services.

Additionally, the *ConnectReach* Terminal provides the following services:

- Services provided with the *BOX* feature
- Analog trunk groups using the *LCR* feature
- DID services to a PBX.

VF services

ConnectReach Terminal or *ConnectReach* 200 can be ordered with CF circuit cards installed for the service required by a specific configuration. Additional CF circuit cards can be ordered to change the service type or add service to an existing system. CS circuit cards are not included in the base systems. CS cards must be ordered separately.



NOTE:

The terminals can contain any combination of up to three CF or CS circuit cards.

Digital data services

Digital data services interface through a 10BaseT Ethernet port connecting to an external Ethernet hub and normally provide services that interface with the Internet and/or a private corporate network. Digital data services are software-based with the DS0 bandwidth on the network DSX-1 interface determined by configuring the software. Bandwidth for digital data services for up to 24 DS0s can be provisioned. At the *FAST* shelf, DS0s providing digital data services are routed to an INA DS1 that interfaces with the Internet and/or a private corporate network. Provided the system is provisioned with the proper software loads, no user-

selectable hardware equipment is needed in the system to provide digital data services.

Secondary T1/DSX-1 services for ConnectReach Terminal

For *ConnectReach* Terminal only, the secondary T1/DSX-1 services supporting PBX, key systems, and routers interface through a secondary T1/DSX-1 port. This interface supports services such as DID.

To support services provided by the secondary T1/DSX-1 interface, the following circuit cards are required:

- For the *ConnectReach* Terminal—Either a fractional T1 card or a fractional T1/DSP combination card

The support of an external router requires a T1-to-V.35 convertor. The secondary T1/DSX-1 port of a *ConnectReach* Terminal also can connect to the network interface of another *ConnectReach* Terminal to provide 48-line service (24 lines from one terminal and 24 lines from the other terminal). Provision the terminal connected to the *FAST* shelf as “master” and the terminal interfacing through the master’s secondary T1/DSX-1 port as “slave” (see the AnyMedia® Access System, *ConnectReach™ Terminal User’s Guide*).

Nonvolatile memory

The *ConnectReach* 200 stores in nonvolatile memory an inventory record readable by using the *FAST* shelf CIT, GSI, or a compatible OS. The record includes physical card types, software version, and software options.

Analog VF POTS service, locally switched special services, and services with the BOX feature for outbound trunks

When equipped with 4-line or 8-line CF circuit cards, the *ConnectReach* Terminal provides analog two-wire VF POTS service, locally switched special services, and services with the *BOX* feature for outward bound trunks. It provides a loop range of 480 ohms including DC off-hook resistance of the phone.

When equipped with 4-line, 8-line, or 16-line CF circuit cards, the *ConnectReach* 200 terminal provides analog two-wire VF POTS service, and locally switched special services. It provides a loop range of 480 ohms including DC off-hook resistance of the phone.

The applications that provide most of these services are described as “metallic VF lines.”

For the *ConnectReach* Terminal or *ConnectReach* 200 to provide a specific number of lines for these services, equip it with up to three 4-line or 8-line CF circuit cards. By configuring the terminal with a combination of 4-line and 8-line cards, this will allow the terminal to contain the following lines of service:

- Up to four lines

- One 4-line card
- Up to eight lines:
 - One 8-line card*
 - Two 4-line cards
- Up to 12 lines:
 - One 8-line card and one 4-line card
 - Three 4-line cards
- Up to 16 lines:
 - Two 8-line cards*
 - One 8-line card and two 4-line cards
 - One 16-line card
- Up to 20 lines:
 - Two 8-line cards and one 4-line card
 - One 16-line card and one 4-line card
- Up to 24 lines:
 - Three 8-line cards*
 - One 16-line card and one 8-line card.



NOTE:

The terminal can only contain any combination of up to three CF or CS circuit cards.

The CF circuit card provides a fast-forward disconnect feature (it reproduces the open interval when the CO open battery interval is longer than 39 ms for loop-ground circuits and 400 ms for E&M circuits). The selection of the POTS or special services loss profile is determined by the far-end CU or provisioning of the digital line unit. If the special services loss characteristic is desired for a loop-start circuit (for example, CO Centrex), the CO termination must be a SPOTS® CU or a digital line unit provisioned for the *SPOTS* current feed CU interface.

When providing these services, the *ConnectReach* Terminal or *ConnectReach* 200 provides the following features/functions:

- Automatically provides loop- or ground-start service
 - On-hook transmission (OHT)
 - Inventory information.
-

* An orderable assembly for the *ConnectReach* Terminal (FXS only)

**ConnectReach
Terminal DID
service, services
with the LCR
feature, and services
with the BOX
feature for inbound
trunks**

When equipped with CS (FXO) circuit cards, the *ConnectReach* Terminal provides dial DPT CS capability for two-wire locally switched DID service. It also supports services provided by the *LCR* feature and services provided by the *BOX* feature for inward bound trunks. It is compatible with reverse-battery signaling on a DID circuit and provides the DPT function between the *ConnectReach* Terminal and the DID trunk circuit of a PBX. The applications that provide most of these services are described as “metallic VF lines with *LCR* feature” and “*BOX* feature.”

When providing these services, the far-end termination can be any of the following:

- 5ESS switch IDCU (GR-303)
- SLC Series 5 AUA43() E *SPOTS* CU provisioned for DPO
- SLC Series 5 carrier AUA36() DPO CU
- SLC-2000 SPQ443 DPO CU
- 5ESS switch DCLU (GR-303).

Provision the transmission loss setting from the *FAST* shelf by using the GSI. The loss may be either 0 dB or 3 dB.

**ConnectReach and
ConnectReach 200
digital data services**

The *ConnectReach* Terminal or *ConnectReach* 200 provides digital data channels through the 10BaseT Ethernet port. The terminal provides this service through software configuration and requires no separate circuit cards or other hardware. When configuring the digital data bandwidth, 64 kbps DS0s are made available in blocks of four (see Note). Total bandwidth for all services cannot exceed 24 DS0s.



NOTE:

If a digital data bandwidth of only one DS0 is provisioned for the customer, the ability to provide other types of service from the *ConnectReach* Terminal or *ConnectReach* 200 on the other three DS0s in the block of four DS0s is lost. However, it is possible to provision any of the remaining three DS0s as digital data bandwidth in the future. (This also applies to voice service.)

The 10BaseT port of the *ConnectReach* Terminal or *ConnectReach* 200, along with the *FAST* shelf, normally provides an interface for digital data services between LAN and the Internet and/or a private corporate network.

The application that provides most of these digital data services is described as “data.”

The *ConnectReach* Terminal or *ConnectReach* 200 can be provisioned to provide a maximum bandwidth of 24 DS0s. Make the DS0s available in blocks of four. This bandwidth serves as the interface between the customer digital data

interface and the digital line pulse code modulation (PCM) bit stream. The customer digital data rate per DS0 is 64 kbps clear channel.

When configuring the functions at the *FAST* shelf for the digital data services of the *ConnectReach* Terminal or *ConnectReach* 200, enter all functions and options through the GSI or locally at the *ConnectReach* Terminal or *ConnectReach* 200.

***ConnectReach*
Terminal services
provided by the
secondary
T1/DSX-1 interface
supporting PBX,
key systems, and
external router**

When the *ConnectReach* Terminal is equipped with the circuit cards listed below, the terminals provide an interface for secondary T1/DSX-1 services supporting PBX, key systems, and an external router through a T1-to-V.35 converter:

- For the *ConnectReach* Terminal—Either a fractional T1 card or a fractional T1/DSP combination card

When using these services, the PBX expects D-bank signaling, and the *FAST* shelf uses D-bank signaling when communicating with the *ConnectReach* Terminal.

The configurations that provide most of these services are described as “secondary T1/DSX-1.”

Even though the services provided by the *ConnectReach* Terminal must be fully provisioned from the *AnyMedia* Access System GSI, it is not necessary to provision parameters such as transmit gain, receive gain, hybrid balance, or equalization slope. The system merely cross-connects DS0s between the primary network T1/DSX-1 interface and the secondary T1/DSX-1 interface to provide this service.

Overview

This chapter provides detailed descriptions of the *ConnectReach* Terminal and *ConnectReach* 200.

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<i>ConnectReach 200 Description</i>	10-10

ConnectReach Terminal Description

Overview

Figure 10-1 shows the physical dimensions of the *ConnectReach* Terminal. The terminal weighs approximately 9 pounds. It can operate within a temperature range of 0 to 50°C (32 to 122°F) at a maximum relative humidity of 95 percent, noncondensing.

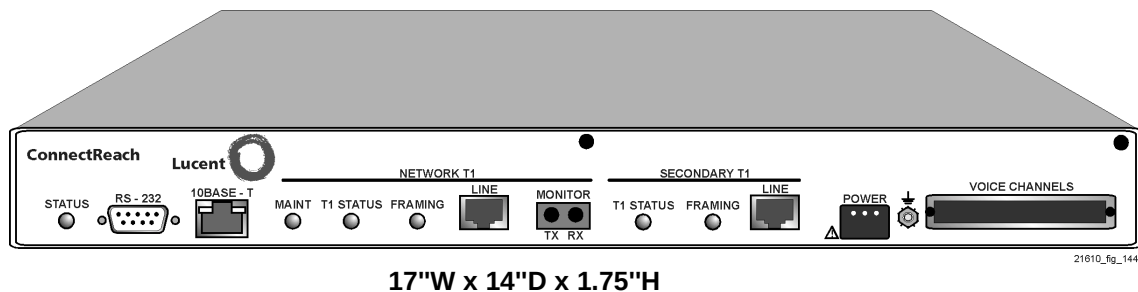


Figure 10-1. *ConnectReach* Terminal Physical Dimensions

Powering

The *ConnectReach* Terminal accepts input power from either an AC or DC power source with the following requirements:

- AC power—The AC input power required for the terminal power supply transformer is 95 to 125 V AC, 60 Hz, and 1.0 amp.
- DC power—The DC input power required for the terminal is 50 VA at 40 to 56 V DC.

Controlled environment only

The *ConnectReach* Terminal is not hardened for outside plant use. The terminal must be installed in a controlled environment such as a telephone equipment closet or a customer premises, and it cannot be mounted in an outside plant cabinet or other locations not protected from environmental hazards. The electrical interfaces of the *ConnectReach* Terminal are not protected from hazards such as lightning and foreign EMF.

Mounting

The *ConnectReach* Terminal can be mounted as follows:

- 19- or 23-inch rack mount
- Wall mount

- Desk top mount.

The minimum clearance around the *ConnectReach* Terminal after it is installed should be:

- Above: 1.75 inches
- Below: 0.0 inches
- Front: 5.0 inches
- Rear: 0.6 inches
- Sides: 2.0 inches

Equipment— general

The *ConnectReach* Terminal can be ordered in several standard configurations depending on the features desired. The choices include the following:

- AC or DC power
- Type and size of FXS and FXO line cards
- Data feature
- *LCR* feature
- *BOX* feature
- Added supporting equipment.

For ordering convenience, there are orderable packaged assemblies with typical needed feature sets. These include a *ConnectReach* Terminal with 24, 16, 8, or no FXS lines, with the data feature, and a choice of AC or DC powering. For detailed ordering information, see the AnyMedia® Access System, *Ordering Guide*.

Internal equipment

The following items are software controlled and are used to configure and provide *ConnectReach* Terminal services (see Figure 10-2 on page 10-6):

- Controller—This is the processor of the unit and controls both operation and maintenance functions of the terminal.
 - TSI fabric—By provisioning the terminal, the TSI fabric controls the bandwidth assigned each service provided by the terminal. The TSI controls up to 24 DS0s and interfaces the services with the network T1/DSX-1 port.
 - Digital data feature—The *ConnectReach* Terminal provides Internet access via the digital data feature, an orderable option.
-

Voice circuit cards

The *ConnectReach* Terminal's three rear loading slots can be equipped with any combination of three of the following two types of circuit cards to provide analog services:

- CF (FXS) circuit card—This card comes in 4-line or 8-line versions. It provides a CF function to interface with analog VF telephone equipment. Each port provides a loop range of 480 ohms including DC off-hook resistance of the phone.
- CS (FXO) circuit card—This card comes in 4-line or 8-line versions. It provides a CS function to interface with telephony equipment such as the analog port of a PBX. It also provides an interface for analog circuits or trunks supporting the *LCR* feature.

Optional internal circuit cards

The internal circuit board for the *ConnectReach* Terminal contains a single expansion slot for one of the following optional circuit cards to enable specific features and services:

- Fractional T1 circuit card—This card enables secondary T1/DSX-1 services. If you require secondary T1/DSX-1 services along with the *LCR* feature, install a fractional T1/DSP processor combination card instead of this card.
- Telco DSP processor circuit card —This card enables the *LCR* and/or *BOX* feature. If your system also requires secondary T1/DSX-1 services, install a fractional T1/DSP processor combination card instead of this card.
- Fractional T1/DSP combination circuit card—This card allows both secondary T1/DSX-1 services and the *LCR* feature and the *BOX* feature.

Primary ports/ connectors

Figure 10-2 on page 10-6 shows the primary ports/connectors on the *ConnectReach* Terminal. They provide the interfaces for the services and for provisioning the terminal. Figure 10-3 on page 10-7 shows the location and the panel-stamped name of each port or connector.

Following are brief descriptions of the primary ports/connectors:

- RS-232 port—This port allows connecting a local provisioning terminal to the terminal or a dial-up modem for a remote provisioning terminal (see *Connecting a Computer Directly to the RS-232 Port* in the AnyMedia® Access System, *ConnectReach™ Terminal User's Guide*). It can interface with a standard 9-pin female/female null modem cable. The *ConnectReach* software can be provisioned from this terminal. The provisioning terminal normally is used to perform initial configuration of the *ConnectReach* Terminal. The null modem cable is required for this connector when connected to a local provisioning PC running terminal emulation software. Once the *ConnectReach* Terminal is installed and fully configured, it can be managed and reconfigured over the network from either the LAN or the WAN/Internet.
- VOICE CHANNELS port—This port contains a 50-pin connector that connects the *ConnectReach* Terminal to voice frequency telephone lines by means of a telephone punch-down block or break-out box at the site. This connector interfaces the voice services with the CF and CS circuit cards. It connects with a cable containing a standard female RJ-21X 25-pair connector. It also allows a connection to an alarm relay.
- Secondary T1 LINE port—This port contains an 8-pin modular RJ-48C connector that accepts the secondary T1/DSX-1 line for the *ConnectReach* Terminal. The secondary T1/DSX-1 line connects the terminal to a PBX or key system that has a DSX-1 interface. To enable this port, the terminal must contain either a fractional T1 circuit card or a fractional T1/DSP processor combination card.
- 10BASE-T port—This port contains an 8-pin modular RJ-45 connector that is the Ethernet LAN port for the *ConnectReach* Terminal. It normally interfaces with an external 10BaseT Ethernet hub.
- Network T1 LINE port—This port contains an 8-pin modular RJ-48C connector that accepts the primary DSX-1 line for the *ConnectReach* Terminal. The network DSX-1 line connects the *ConnectReach* Terminal to the *AnyMedia* Access System.

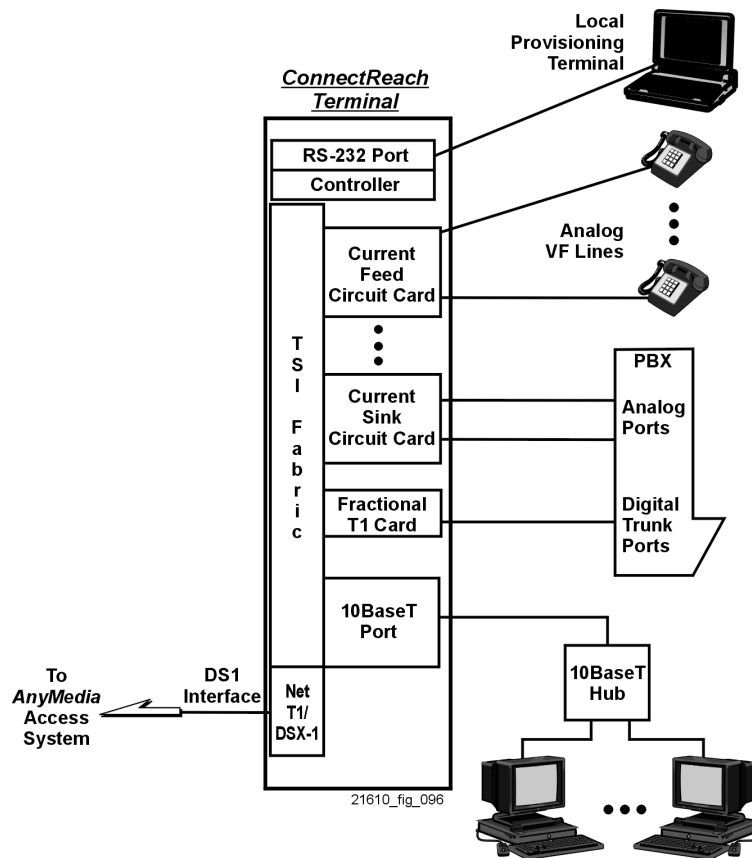


Figure 10-2. *ConnectReach* Terminal Block Diagram

Other connectors and ports

Other connectors and ports provide for monitoring and testing, along with power and ground. These connectors and ports are on the front panel and are shown in Figure 10-3 on page 10-7:

- Network T1 MONITOR port—This port accepts standard bantam miniature telephone plugs from test equipment used to monitor the network T1/DSX-1 line.



NOTE:

If it is necessary to connect test equipment to the network T1 line MONITOR connector, be sure the test equipment is operating in the *bridge* mode. Otherwise, the test equipment can terminate the T1/DSX-1 line, thereby reducing T1/DSX-1 receive signal strength to the *ConnectReach* Terminal.

- **POWER port**—This port contains a 3-pin Molex connector that accepts the power cord from either a 120 V AC power supply transformer or a DC power source.
- **Ground stud**—This stud allows you to ground the *ConnectReach* Terminal to the local ground.

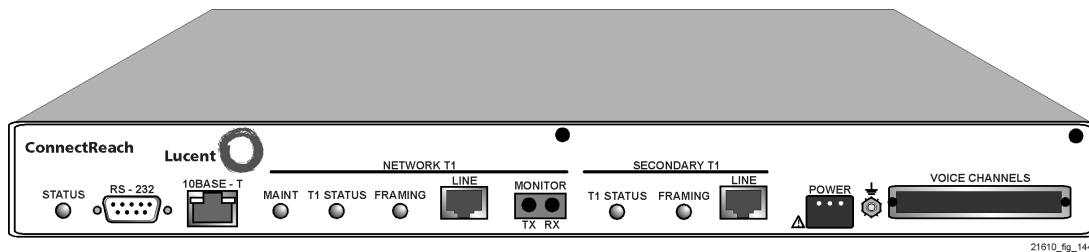


Figure 10-3. *ConnectReach* Terminal Faceplate

LED indicators

Figure 10-3 shows the positions of the LED indicators on the *ConnectReach* Terminal apparatus case. Following are brief descriptions of each of these LEDs:

- **STATUS LED**—This green LED provides an indication of the status of the self-test and activity on the T1/DSX-1 line according to the state of the LED. The various states of the STATUS LED and their indication are as follows:
 - **On**—Self-test was successful; no packets are being sent/received on the T1/DSX-1 line.
 - **Flashing**—Self-test was successful; data packets are being sent/received on the T1/DSX-1 line.
 - **Off**—Self-test failed.
- **MAINT LED**—This yellow LED provides an indication of a network loopback or active diagnose command. The various states of the MAINT LED and their indication are as follows:
 - **On**—Network loopback is present on the network T1/DSX-1 line.
 - **Flashing**—A diagnose command is active.
 - **Off**—The *ConnectReach* Terminal is operating normally.
- **Network and secondary T1/DSX-1 STATUS LEDs**—These yellow LEDs provide an indication of a yellow alert or bipolar violations on the network and/or secondary T1/DSX-1 line. The various states of the T1 STATUS LEDs and their indication are as follows:
 - **On**—A yellow alert has occurred in the last second.

- Flashing—One or more bipolar violations has occurred in the last second.
- Off—The *ConnectReach* Terminal is operating normally.

**NOTE:**

The T1 STATUS LED for the secondary T1/DSX-1 line will operate only if the secondary T1/DSX-1 line is installed and enabled.

- Network and secondary T1/DSX-1 FRAMING LEDs—These red LEDs provide an indication of a red alarm condition or a high bit error rate on the network and/or secondary T1/DSX-1 line. The various states of the FRAMING LEDs and their indication are as follows:
 - On—A red alarm condition is present.
 - Flashing—The framing bit error rate has exceeded $10E^{-5}$ in the last second.
 - Off—The *ConnectReach* Terminal is operating normally.

**NOTE:**

The FRAMING LED for the secondary T1/DSX-1 line will operate only if the secondary T1/DSX-1 line is installed and enabled.

External equipment Universal serial interface card

This card can be ordered separately if the system requires an interface with a legacy router, CSU/DSUs, etc. The card converts a fractional DSX-1 signal to a standard V.35 interface. This card plugs directly into the secondary T1/DSX-1 port using an RJ-48C connector. The card provides a standard V.35 (M/34 male) interface to a router. To order this card, see the AnyMedia[®] Access System, *Ordering Guide* for the ordering information

NEBS installation kit

The network equipment building standards (NEBS) installation kit allows the *ConnectReach* Terminal to meet Telcordia Technologies, Inc. NEBS Level 3 standards presented in GR-63. With this kit installed, the system will meet the Telcordia Technologies, Inc. requirements for:

- Earthquake (zone 4 level)
- Operating thermal temperature
- Storage, transport handling
- System flammability.

Without the kit installed, the unit still complies with all requirements of NEBS Level 3, with the exception of the Shelf-Level Fire test (GR-63 criteria R4-20).

ConnectReach 200 Description

ConnectReach Series

The *ConnectReach* 200 Series is composed of three types of ConnectReach 200s.

ConnectReach 208

Integrated/fixed-configuration voice and data IAD equipped with one T1 interface, 8 FXS analog voice ports, integrated CSU, Frame Relay, IP Routing, DHCP, NAT, PAT, Firewall, SNMP, and external power supply.

ConnectReach 216

Integrated/fixed-configuration voice and data IAD equipped with one T1 interface, 16 FXS analog voice ports, integrated CSU, Frame Relay, IP Routing, DHCP, NAT, PAT, Firewall, SNMP, and external power supply.

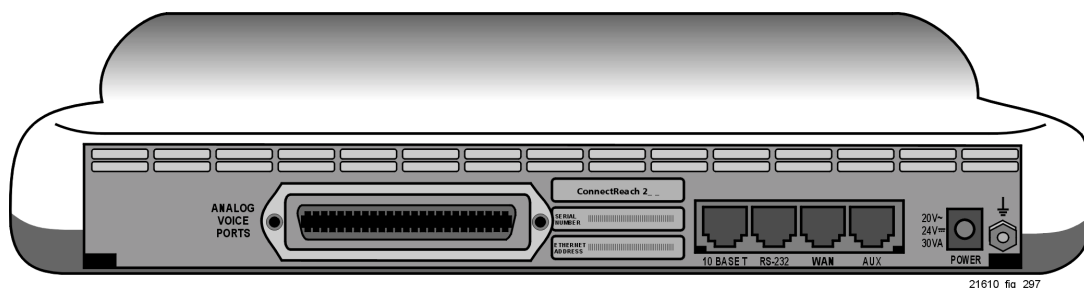
ConnectReach 224

Integrated/fixed-configuration voice and data IAD equipped with one T1 interface, 24 FXS analog voice ports, integrated CSU, Frame Relay, IP Routing, DHCP, NAT, PAT, Firewall, SNMP, and external power supply.

Figure 10-4 shows the physical dimensions of the *ConnectReach* 200.

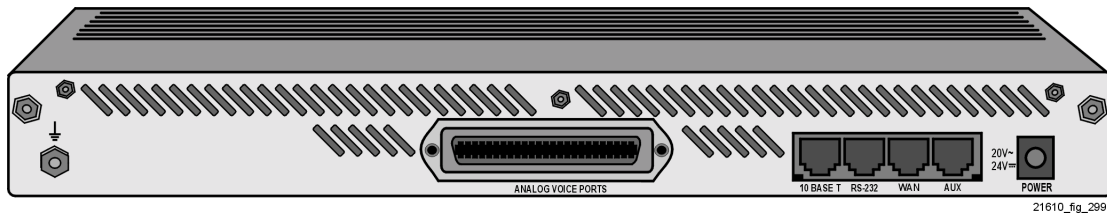
- Size: 1.76" (4.5 cm) high X 9.64" (23.5 cm) deep X 12.48" (30 cm) wide
- Weight: 3 lbs. (1.36 kg)

The terminal weighs 3 lbs. (1.36 kg). It can operate within a temperature range of 0 to 50 degrees C (32 to 122 degrees F) with relative humidity at 5 to 95 percent, noncondensing at 40 degrees C.



12.48"W x 9.64"D x 1.76"H

Figure 10-4. *ConnectReach* 208/216 Terminal Physical Dimensions



12.48"W x 9.64"D x 1.76"H

Figure 10-5. ConnectReach 224 Terminal Physical Dimensions

Powering

The *ConnectReach 200* accepts input power from either an AC or DC power source with the following requirements:

AC installations

- 120V AC, 60 Hz, for the 120V AC to 20V AC transformer provided with the *ConnectReach 200*.



NOTE:

The external AC transformer unit for the *ConnectReach 208/216* is not interchangeable with the external AC transformer unit for the *ConnectReach 224*. **Do not use the lower-power rated transformer provided with the *ConnectReach 208/216* to power the *ConnectReach 224*.**

DC installations

- Input voltage to unit: 24V DC, minimum of 20 VA available



NOTE:

The *ConnectReach 200* **does not accept 48V DC power supply**. Use of 48V DC can cause damage to the unit. Also, make sure that the power supply is adequate for the particular model of *ConnectReach 200* installed. There are different power ratings for the different *ConnectReach 200* models. See the Release Notes for the model you are installing.

Controlled environment only

The *ConnectReach 200* is not hardened for outside plant use. The terminal must be installed in a controlled environment such as a telephone equipment closet or

a customer premises, and it cannot be mounted in an outside plant cabinet or other locations not protected from environmental hazards. The electrical interfaces of the *ConnectReach* 200 are not protected from hazards such as lightning and foreign EMF.

Mounting

The *ConnectReach* 200 can be mounted as follows:

- Wall mount
- Desk top mount.

Mounting instructions are described in the *AnyMedia® Access System ConnectReach™ 200 Series User's Guide*

Internal equipment

The following items are software controlled and are used to configure and provide *ConnectReach* 200 services (see Figure 10-6 on page 10-14):

- Controller—This is the processor of the unit and controls both operation and maintenance functions of the terminal.
 - TSI fabric—By provisioning the terminal, the TSI fabric controls the bandwidth assigned each service provided by the terminal. The TSI controls up to 24 DS0s and interfaces the services with the network T1/DSX-1 port.
 - Digital data feature—The *ConnectReach* 200 is equipped with the digital data feature (Internet access).
-

Voice circuit cards

The *ConnectReach* 200 Series is available as follows:

- *ConnectReach* 208 has 8 lines
 - *ConnectReach* 216 has 16 lines
 - *ConnectReach* 224 has 24 lines.
-

Network interface circuit cards

Three front loading slots can be equipped with one or more network interface cards depending on the application chosen.

Primary ports/ connectors

Figure 10-6 on page 10-14 shows the primary ports/connectors on the *ConnectReach* 200. They provide the interfaces for the services and for provisioning the terminal. Figure 10-6 on page 10-14 shows the location and the panel-stamped name or circuit pack name of each port or connector.

Ports/connectors on *ConnectReach 200*

- RS-232 port—This port allows connecting a local provisioning terminal to the system or a dial-up modem for a remote provisioning terminal (see *Making connections to ConnectReach 200* in the AnyMedia® Access System, *ConnectReach™ 200 Series User's Guide*). It can interface with a standard 9-pin female/female null modem cable. The *ConnectReach 200* software can be provisioned from this terminal. The provisioning terminal normally is used to perform initial configuration of the *ConnectReach 200*. The null modem cable is required for this connector when connected to a local provisioning PC running terminal emulation software. Once the *ConnectReach 200* is installed and fully configured, it can be managed and reconfigured over the network from either the LAN or the WAN/Internet.
- 10BASE-T Ethernet port—This port contains an 8-pin modular RJ-45 connector that is the Ethernet LAN port for the *ConnectReach 200*. It normally interfaces with an external 10BaseT Ethernet hub.
- VOICE CHANNELS ports—Three ports, each containing a 50-pin telephony type connector that connects the *ConnectReach 200* to voice frequency telephone lines by means of a telephone punch-down block or break-out box at the site. This connector interfaces the voice services with the CF and CS circuit cards. It connects with a cable containing a standard female RJ-21X 25-pair connector. It also allows a connection to an alarm relay. On the *ConnectReach 208*, only pin pairs 1/26 through 8/33 are used.



NOTE:

These ports are located on the back of the *ConnectReach 200*. Each port has access to 16 VF lines.

Ports/connectors on network interface card

- T1 LINE port—The T1 LINE port on the first network interface card contains an 8-pin modular RJ-48C connector that accepts the primary DSX-1 line for the *ConnectReach 200*. The T1/DSX-1 line connects the *ConnectReach 200* to the AnyMedia Access System.

The T1 LINE port on the second network interface card contains an 8-pin modular RJ-48C connector that accepts the secondary T1/DSX-1 line for the *ConnectReach 200*.

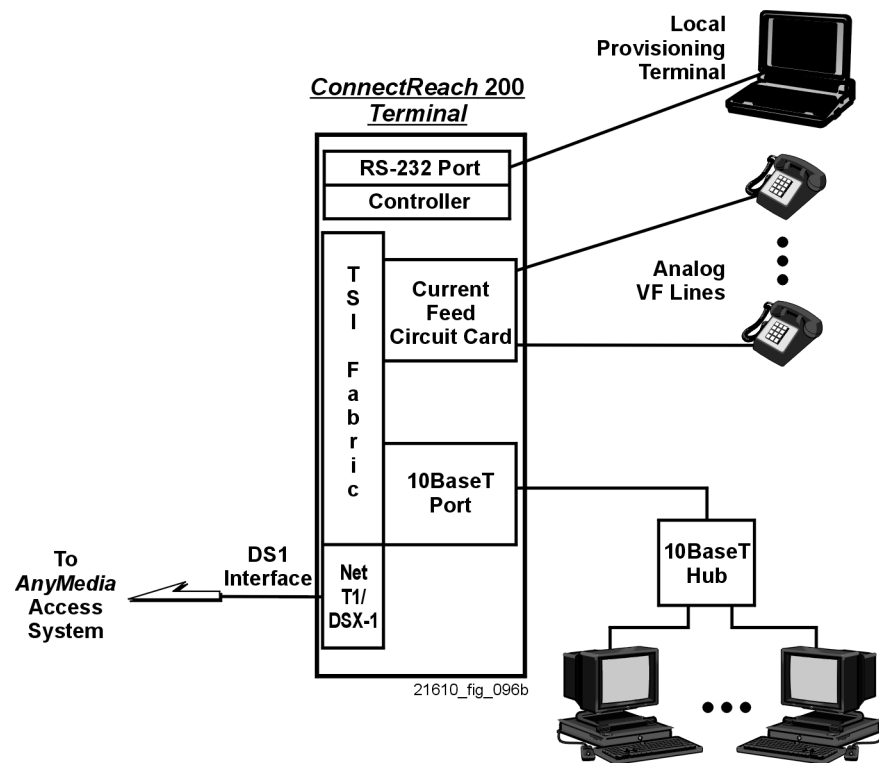


Figure 10-6. *ConnectReach 200 Terminal Block Diagram*

Other connectors and ports

Other connectors and ports provide for monitoring and testing, along with power and ground. These connectors and ports are part of the faceplate and are shown in Figure 10-6 on page 10-14:

- **POWER port**—This port contains a 3-pin Molex connector that accepts the power cord from either a 120 V AC power supply transformer or a DC power source.
- **Ground stud**—This stud allows you to ground the *ConnectReach 200* terminal to the local ground.

LED indicators

Figure 10-7 on page 10-15 shows the positions of the LED indicators on the front panel of the *ConnectReach 200s*.

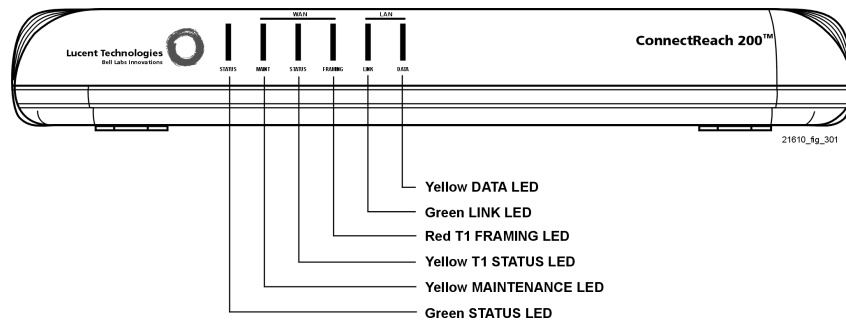


Figure 10-7. *ConnectReach 208 and ConnectReach 216 Faceplate*

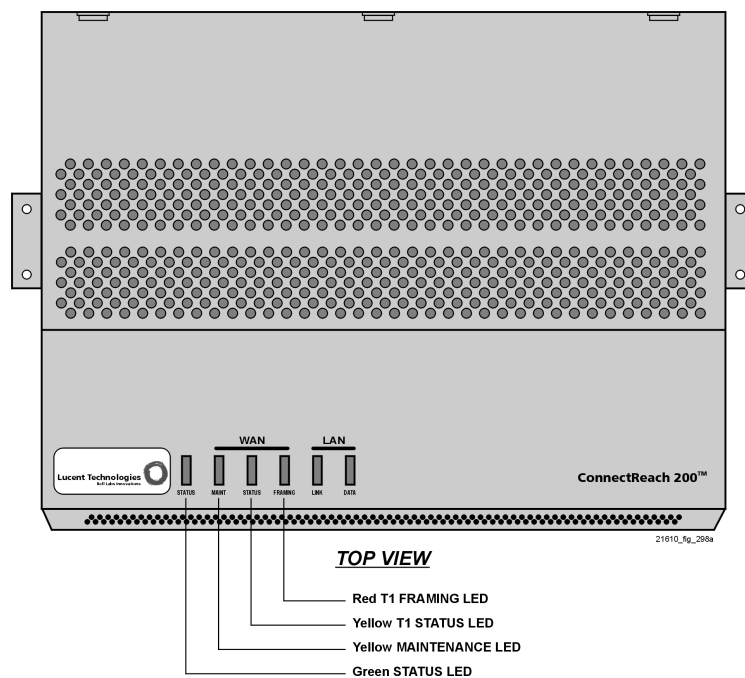


Figure 10-8. *ConnectReach 224 Faceplate*

LEDs on *ConnectReach 200*

- **STATUS LED**—These green LEDs provide an indication of the status of the self-test and activity on the T1/DSX-1 line according to the state of the LEDs. The various states of the STATUS LEDs indicate the health and functionality of the *ConnectReach 200*. For further information on the self-test STATUS LEDs, see *Using the self-test results to detect trouble* in the *ConnectReach™ 200 Series User's Guide*.

Ethernet port LEDs

The Ethernet port has two built-in LEDs that labeled LAN on the faceplate of the *ConnectReach 200*:

- The green “link integrity” LED. This LED lights when the link between the *ConnectReach 200* and the Ethernet hub is functioning.
 - The yellow “activity” LED. This LED blinks when the *ConnectReach 200* transmits or receives data to and from the Ethernet port.
-

Overview

This chapter describes the *ConnectReach* Terminal and *ConnectReach* 200 operation interfaces, including the user interface. Preconfiguration information is described as well as required provisioning information.

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<i>Configuration Management—Provisioning</i>	11-2
<i>Configuration Management—Preconfiguration Information</i>	11-4

Configuration Management— Provisioning

Overview

This section provides information on the following:

- Methods for provisioning *ConnectReach* Terminal and *ConnectReach* 200
 - Assigning login names and passwords
 - Feature keys for orderable additional features.
-

Methods for provisioning *ConnectReach* Terminal and *ConnectReach* 200

There are two provisioning methods for *ConnectReach* Terminal and *ConnectReach* 200:

- Command line sessions
- HTTP session using a Web browser.

Command line sessions

A command line session can be initiated over any of the following:

- *ConnectReach* Terminal and *ConnectReach* 200 local RS-232 port
- TELNET through the *ConnectReach* Terminal and *ConnectReach* 200 10BaseT port
- TELNET through the DS1 facility (requires some bandwidth allocated for data services on the DS1 interface)
- *AnyMedia* Access System OAM&P interfaces. (The ACT - IAT TL1 command must be executed to access the *ConnectReach* Terminal and *ConnectReach* 200 via the facility data link for *ConnectReach* Terminal and *ConnectReach* 200 provisioning.)

HTTP session

An HTTP session can be initiated over either of the following:

- *ConnectReach* Terminal and *ConnectReach* 200 local 10BaseT port
 - DS1 facility (requires some bandwidth allocated for data services on the DS1 interface).
-

Assigning login names and passwords

When an unconfigured *ConnectReach* Terminal or *ConnectReach* 200 is initially accessed, no login name and password are required. The terminal immediately displays the main menu prompt for the terminal utility. For security reasons, the *ConnectReach* Terminal or *ConnectReach* 200 should be configured with login names and passwords.

When logging into the *ConnectReach* Terminal or *ConnectReach* 200 by means of a Telnet session or the RS-232 port, there is only one level of privilege for configuring and monitoring the system. This privilege is called Carrier. But when logging into the *ConnectReach* Terminal or *ConnectReach* 200 using a Web browser, there are two levels of privilege, Carrier and User. The two privilege levels offer different sets of available commands.

- Carrier privilege—This privilege allows unlimited access to all configuration and monitoring commands. One login name may be set with Carrier privilege. Carrier privilege is designed for use by a limited number of individuals permitted to configure the *ConnectReach* Terminal or *ConnectReach* 200. The use of this privilege should be carefully restricted.
- User privilege—This privilege allows limited access to configuration commands. User passwords can be changed. User privilege also allows access to the monitoring commands. One login name may be set with User privilege.

The login name and password verification utility is case sensitive. When logging in, the name and password strings must be entered exactly as configured, including uppercase or lowercase characters.

After three failed attempts, the user cannot log in for 5 minutes. After 20 failed attempts, the user cannot log in for 1 hour.

After 5 minutes of inactivity, the user is automatically logged off.

Passwords are stored using one-way encryption. If a customer loses or forgets the user password, log in with Carrier privilege and set the user password. However, if the Carrier password is lost or forgotten, contact Lucent Technologies NetCare Knowledge Center (NKC) at 1-866-LUCENT8 for assistance.

Feature keys

ConnectReach Terminal has orderable additional features, like *LCR* and *BOX*, that are installed either on initial order or by field addition via feature keys. When ordered initially with a *ConnectReach* Terminal, the software is installed and activated without any customer action. When ordered for future installation, the customer is furnished a feature key, related to the terminal serial number, that will turn on the desired feature.

Configuration Management— Preconfiguration Information

Overview

The *AnyMedia® Access System ConnectReach™ User's Guide* and the *AnyMedia® Access System ConnectReach™ 200 Series User's Guide* each provide a Preinstallation Worksheet and a Preconfiguration Worksheet and detailed information for completing them.

List of Acronyms

A

A/D	analog/digital
AAL	ATM adaptation layer
ABN	active balance network
ABSBH	average busy season busy hour
AC	alternating current
ACD	automatic call distributor
ACO	alarm cutoff
ADPCM	adaptive differential PCM
ADSL	asymmetric digital subscriber line
ADSL-R	ADSL transceiver unit—remote end
AFM	ATM feeder multiplexer
AID	access identifier
AIP	access interface platform or alarm interface panel (not used as ac)
AIS	alarm indication signal
AIS-L	alarm indication signal-line
AIU	access interface unit
ALC	automatic loss control; automatic level/loss compensation
ALC5	automatic loss compensation—5
ALIT	automatic line insulation test
AMI	alternate mark inversion

ANSI	American National Standards Institute
AOS	<i>AnyMedia</i> Access System operations software
AP	application pack
APOG	applications, planning, and ordering guide
ARM	access resource manager
ASCII	American standard code for information interchange
ATM	asynchronous transfer mode
ATU	alarm test unit
ATU-C	ADSL transceiver unit - Central Office
ATU-R	ADSL transceiver unit - remote end
AWG	American wire gauge

B

B8ZS	bipolar with eight zeros substitution
BAIU	broadband access interface unit
BB	broadband
BDFB	battery distribution fuse bay
BER	bit error ratio
BIST	built-in self-test
BITS	building integrated timing supply
BRI	basic rate interface
BRITE	basic rate interface transmission extension
BT	bridged tap
BWM	broadcast warning message

C

C/N	carrier-to-noise ratio
CAC	connection admission control
CASTL	customer advocate system test lab
CBR	constant bit rate
CC	clear channel
CCITT	international telephone and telegraph consultative committee

CCN	customer change notice
CCS	hundred call seconds
CD-ROM	compact disk - read only memory
CDVT	cell delay variation tolerance
CEV	controlled environment vault
CF	current feed
CIT	craft interface terminal
CL	center line
CLF	carrier line failure
CLP	cell loss priority
CMI	control mode idle
CMIS	common management information service
CN	change notice
CO	central office
COACH	customized online aid for customer help
COMDAC	common data and control
COPM	customer operations and program management
CORRCNT	corrected HEC error counter
COT	central office terminal
CPE	customer premises equipment
CPFT	customer premises facility terminal
CPI	calling party identification
CPS	cabinet power system
CR	critical
CRC	cyclic redundancy check
CRV	call reference value
CS	current sink
CSA	carrier serving area
CSMD/CD	carrier sense multiple access/collision detection
CSS	controlled slip seconds
CSS-P	controlled slip seconds-path

CSU	channel service unit
CTS	customer technical support
CTU	craft test unit
CU	channel unit
CV	coding violation
CV-P	coding violation-path

D

DACS	digital access cross-connect system
dB	decibel
dBm	decibel referenced to one milliwatt
DC	direct current
DCD	received line signal detector
DCE	data communication equipment
DCLU	digital carrier line unit
DCN	data communication network
DCS	digital cross-connect system
DCTP	direct current test pair
DDL	delivered data link
DDM	digital data multiplexer
DDS	digital data services
DFI	digital facilities interface
DHCP	dynamic host configuration protocol
DID	direct inward dialing
DLC	digital loop carrier
DLCI	data link connection identifier
DM	degraded minute
DMT	discrete multitone
DMU	digital measurement unit
DNIS	dialed number identification service
DNS	domain name service
DNUS	digital network unit–subscriber

DOD	direct outward dialing
DP	data port or dial pulse
DPFU	dual power feed unit
DPO	dial pulse originate
DPT	dial pulse terminate
DRAM	dynamic random access memory
DS0	digital signal, level 0
DS1	digital signal, level 1
DS3	digital signal, level 3
DSL	digital subscriber line
DSP	digital signal processor
DSR	DCE ready
DSU	data service unit
DSX	digital signal cross-connect
DSX-1	digital signal cross-connect, level 1
DSX-3	digital signal cross-connect, level 3
DTC	digital trunk controller
DTE	data terminal equipment
DTMF	dual tone multifrequency
DU	data unit
DX	duplex

E

EBS	enhanced business service
EC	error correction
ECI	equipment catalog item
E&M	ear and mouth
EM	element manager
EMC	electromagnetic compatibility
EMF	electromotive force
EMI	electromagnetic interference
EMS	electromagnetic susceptibility

EOC	embedded operations channel
EPD	echo path delay
ERL	echo return loss
ES	errored seconds
ESD	electrostatic discharge
ESF	extended superframe
ES-L	errored seconds-line
ES-P	errored seconds-path
ETO	equalized transmission only

F

4TDM	four-wire tandem
FC	failure count
FCC	Federal Communications Commission
FCM	fuse circuit module
FDI	feeder distribution interface
FE	far end
FEAC	far end alarm and control
FELP	far end loopback
FITL	fiber in the loop
FITs	failure in 10 ⁹ hours
fpm	flashes per minute
FSA	first site application
FSAN	full service access network
FTP	file transfer protocol
FX	foreign exchange
FXO	foreign exchange office
FXS	foreign exchange station

G

GA	general availability
GCRA	generic cell rate algorithm

GOS	grade of service
GPB	general purpose bus
GPC	general purpose communications
GR-303	Telcordia Technologies, Inc. Standard GR-303
GSFN	generic signaling function
GSI	graphical system interface
GTL	Gunning transceiver logic
GTSIP	global technical support information platform

H

HBER	high BER
HCS	header check sequence
HDBH	high day busy hour
HDLC	high-level data link control
HDSL	high bit rate digital subscriber line
HDSL2	high bit rate digital subscriber line-second generation
HDT	host digital terminal
HEC	header error code
HTTP	hypertext transfer protocol
Hz	hertz

I

I/O	input/output
IAD	integrated access device
IAT	integrated access terminal
IATSI	IAT system interface
IBERT	integrated bit error test
ICLE	initial customer laboratory evaluation
ICP	IMA control protocol
ID	identifier
IDCU	integrated digital carrier unit
IDLC	integrated digital loop carrier

IDT	integrated digital terminal
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IMA	inverse multiplexing for ATM
IMLT	integrated mechanized loop testing
INA	integrated network access
INIT	initialization/diagnostic
IP	Internet protocol
IPX	Internet packet exchange
IS	in service
ISDL	integrated subscriber digital line
ISDN	integrated services digital network
ISO	international organization for standards
ISP	Internet service providers
ITU	International Telecommunications Union
IV	ICP cell violation
IXC	interexchange carrier

K

kbps	kilobits per second
kBps	kilobytes per second
kHz	kilohertz
kW	kilowatt

L

LAN	local area network
LAPD	link access protocol D-channel
LBO	lightguide build out
LCD	loss of cell delineation
LDS	local digital switch
LED	light-emitting diode
LFACS	loop facilities assignment and control system

LLN	logical line number
LMI	local management interface
LOCD	loss of cell delineation
LOF (lof)	loss of frame
LOFA	loss of frame alignment
LOP	loss of pointer
LOS (los)	loss of signal
LOST	loss of signal timeout
LSAS	line side answer supervision
LTD	local test desk
LTF	loop test frame
LTS	loop test system
LULT	line unit network termination
LUNT	line unit network termination

M

mA	milliampere
MAT	Metropolitan Area T-carrier
Mbps	megabits per second
MBps	Megabytes per second
MBS	maximum burst size
MDF	main distributing frame
MDS2	metallic distribution shelf 2
MDSU	metallic distribution server unit
MEA	mismatch of equipment and attributes
MHz	mega hertz
MIB	management information base
MJ	major
MLTS	multiline telecommunications system
MMSU	modular metallic service unit
MN	minor
MR	modification request

ms	millisecond
MSC	metallic shelf controller
MSG	message switch
MTBF	mean time between failures
MTU	maximum transfer unit
MVEC	majority vote error correction

N

NB	narrowband
NCTE	network channel terminating equipment
NE	near end or network element
NEBS	network equipment building systems
NEC	national electric code
NI	network interface
NIC	network interface card
NMP	network management protocol
NMS	network management station
nrt-VBR	nonreal time variable bit rate
NSA	nonservice affecting
NT 1	network termination - 1
NTP	network time protocol
NTT	no test trunk
NTR	network timing reference
NVDS	nonvolatile data storage
NVPS	nonvolatile program storage

O

OAM&P	operations, administration, maintenance, and provisioning
OAP	optical application pack
OC	optical carrier
OCU	office channel unit
OE	originating equipment

OHT	on-hook transmission
OLIU	optical line interface unit
ONU	optical network unit
OOS	out of service
OPS/INE	operations system for intelligent network
OS	operations system
OSMINE	operations systems modification of intelligent network elements
OSP	outside plant
OTGR	operations technology generic requirements

P

P/AR	peak to average ratio
PAM	pulse amplitude modulation
PBX	private branch exchange
PC	personal computer
PCI	peripheral component interconnect
PCM	pulse code modulation
PCR	peak cell rate
PDF	portable document format
PGTC	pair gain test controller
PIDB	processor interface data bus
PLAR	private line automatic ring
PLCP	physical layer convergence protocol
PLN	physical line number
PLR	pulse line repeater
POTS	plain old telephone service
ppm	parts per million
PPP	point to point protocol
PRC-Access	Product Realization Center-Access
PRI	primary rate interface
PRS	primary reference source
PSAP	public safety answering point

PSD	power spectral density
PSDM	power spectral density mask
PSES	p-bit severely errored seconds
PSTN	public switched telecommunications network
PTU	power and test unit
PVC	permanent virtual circuit
PVP	permanent virtual path

Q

QMON	quality monitoring
QOS	quality of service

R

RACO	remote alarm cutoff
RADSL	rate adaptive digital subscriber line
RAI	remote alarm indication
RAM	random access memory
RCLK	receive clock
RC/V	recent change/verify
RD	ring down
RDI	remote defect indication
REFCLK	reference clock
REN	ringing equivalence number
RFI	remote failure indication
RIP	routing information protocol
RMU	remote measurement unit
ROC	remote operations channel
R-S	Reed-Solomon
RSF	receive signal failed
RT	remote terminal
rt-VBR	real time variable bit rate
RTAC	regional technical assistance center

RTLP	receive transmission level point
RTU	remote test unit

S

SA	service affecting
SARTS	Switched Access Remote Test System
SAS-P	severely errored framing/alarm indication signal seconds-path
SCEC	second channel error correction
SCR	sustained cell rate
SDSL	symmetric digital subscriber line
SEFS	severely errored framing seconds
SEFS-P	severely errored framing seconds-path
SES	severely errored seconds
SES-P	severely errored seconds-path
SF	superframe
shelf_PCR	shelf peak cell rate
SID	source identifier
SL	selecting slope
SNMP	simple network management protocol
SNR	signal to noise ratio
SONET	synchronous optical network
SWDL	software download

T

TAP	test access path
TBCU	test bus control unit
TCA	threshold crossing alert
TCP/IP	transmission control protocol/Internet protocol
TDM	tandem
TDR	time domain reflectometry
TL1	transaction language -1
TL1SI	TL1 system interface

TLP	transmission level point or test level point
TMC	timeslot management channel
TMS	transmission (test) measuring set
TO	transmission only
TOS	test operations system
TR	technical reference
TR-08	Telcordia Technologies, Inc. Standard TR-008
TSA	timeslot assignment
TSC	test system controller
TSG	timing signal generator
TSI	time slot interchange
TTF	transmission test facility
TTLP	transmit transmission level point

U

UART	universal asynchronous receiver/transmitter
UAS	unavailable seconds
UAS-P	unavailable seconds-path
UBR	unspecified bit rate
UCC	universal communication channel
UDP	user datagram protocol
U-DSL	U-interface digital subscriber line
UIP	user interface panel
UNCCNT	uncorrected HEC error counter
UNI	user network interface
UPC	usage parameter control
USB	universal serial bus
UPN	urgent problem notification
UVG	universal voice grade

V

VB	virtual bank
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VBR	variable bit rate
VC	virtual circuit (traditional DLC services) or virtual channel (ATM xDSL services)
VCC	virtual channel connection
VCI	virtual channel identifier
VCOT	virtual central office terminal
VDC	volts direct current
VDSL	very high speed digital subscriber line
VF	voice frequency
VFDE	voice frequency data enhancement
VGA	video graphics array
VoDSL	voice over digital subscriber line
VOM	volt ohm meter
VP	virtual path
VPC	virtual path connection
VPI	virtual path identifier
VPN	virtual private network
Vrms	volts root mean square
VRT	virtual remote terminal
VT	virtual tributary

W

WAN	wide area network
WATS	wide area telephone service
WL	working length

X

XTC	extended test controller
-----	--------------------------

Z

ZBS	zero byte substitution
ZCS	zero code suppression

Glossary

Numerics

10BaseT	IEEE 802.3 standard for Ethernet transmission over unshielded twisted pair.
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A

Access interface platform	A family of equipment that provides cost-effective and flexible access for different services; e.g., voice and data, using a common platform.
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ADSL-lite	A version of asymmetric digital subscriber line (ADSL) that is less expensive than full-rate ADSL and that operates at a lower bit rate than full-rate ADSL. This version of ADSL is specified in ITU-T G.992.2.
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AnyMedia operations gateway	Operations access for up to 20 RTs via universal communication channels (UCCs).
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Application layer (OSI)	A layer of OSIRM. Provides the management of communications between user applications. Examples include e-mail and file transfer.
--------------------------------	---

Asymmetric digital subscriber line (ADSL)	A method of data transmission over unloaded copper loops. The data rate transmitted toward the end user is typically much higher (e.g., 6 Mbps) than the data rate transmitted by the end user (e.g., 640 Kbps).
--	--

Asynchronous transfer mode (ATM)	A high-speed connection-oriented multiplexing and switching method that utilizes fixed-length cells to support multiple types of traffic. Transmission is synchronized at the start and end of each character, allowing different types of services to be carried over one system.
---	--

ATM adaptation layer (AAL)	A set of internationally standardized protocols and formats that define support for circuit emulation, packet video and audio, and connection-oriented and connectionless data services. There are four standard protocols defined for AAL—AAL1, AAL2, AAL3/4, and AAL5. AAL5 is used for bursty LAN traffic and uses the conventional five-byte ATM header. AAL5 does not support cell multiplexing.
ATM feeder	The connection from the AFM to the ATM transport network. This connection may be either DS3, DS1, or OC-3c. The ATM feeder may connect directly to an ATM switch or access concentrator device. In addition, the connection between the AFM and the switch or access concentrator may incorporate a multiplexer. In daisy-chained configurations, the ATM feeder for each AFM, except the one closest to the switch or access concentrator, connects to the previous AFM in the chain. This connection may be direct or through a multiplexer. Note that daisy-chaining is available only with DS3 and OC-3c AFMs.
ATM-RSF on ADSL line	Ten consecutive seconds with each second having one or more of the following anomalies: — At least 18 ADSL superframes with ATM HEC anomalies — At least one ADSL superframe with ATM cell delineation anomalies.
ATM technology	Asynchronous transfer mode is a data communications format in which transmission is synchronized at the start and end of each character, allowing different types of services to be carried over one system.
Attenuation of ADSL line	The difference in dB between the power received at the far end and the power transmitted by the near end.
Authentication	Process used to verify that only those users or operating systems authorized to access the system are permitted to do so and to ensure that the user or operating system is only allowed to alter or extract its authorized data.
Auto discovery	Automatically updates and maintains an inventory of the <i>AnyMedia</i> FAST shelf.
Autonomous reports	Messages sent by the <i>AnyMedia</i> Access System to operations systems or element managers (EMs) to report conditions such as errors, faults, and threshold crossings. The <i>AnyMedia</i> Access System's processors decide when or what messages are sent; they are not externally requested.

B

Basic rate interface (BRI)	An ISDN access interface type made up of two B channels, each at 64 kbps, and one D channel at 16 kbps (2B+D).
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B channel	An ISDN bearer service channel that can carry either voice or data at a speed of 64 kbps.
Bit error ratio	The quality of transmission is measured in the number of errored bits per number of bits received.
Broadband services	High speed data and asynchronous transfer mode services.

C

Cell	A fixed-length 53-octet packet used in ATM. The AM cell has a 5-octet header and a 48-octet payload.
Cell header	A 5-octet header that defines control information used in processing, multiplexing, and switching cells.
Cells received	The total number of cells that the shelf received from the CPE.
Channel	The electronics portion of a digital loop carrier line; typically from the tip/ring output of the channel unit or application pack toward the central office. Includes up to the switch interface if integrated DLC. Includes the transmit and receive DS0s, codecs, and hybrids.
<i>ClearReach</i> feature	The <i>ClearReach</i> feature for the <i>ConnectReach</i> Terminal and <i>ConnectReach</i> 200 that improves modem performance. The <i>ClearReach</i> feature requires voice frequency data enhancement (VFDE) in the <i>AnyMedia FAST</i> shelf.
Collocation	Grouping entities in the same physical location.
Common unit	A unit, or application pack, that performs the main bandwidth management and control for the <i>AnyMedia FAST</i> shelf.
Competitive access	The ability for nonincumbent carriers to provide local access.
Configuration management	Consists of a set of functions to exercise control over elements in the network, including initialization, parameter setting, starting and stopping, and collection of information about the configuration.
Craft interface terminal (CIT) port	The port on the craft test unit (CTU) where the graphical system interface (GSI) or a TL1 system interface (TL1SI) is connected.
Customer premises equipment (CPE)	Equipment that resides and is operated at a customer site.
Cyclic redundancy check (CRC)	An algorithm that detects bit errors causes in data transmission.

D

D4	A framing and synchronization format for T1 transmission facilities.
Dangler cable	Cable that effectively brings a backplane connector to the front of the shelf.

Data communications (or circuit termination) equipment (DCE)	A modem or network communications interface device.
Data terminal equipment (DTE)	Data processing equipment that interfaces to the communications network (DCE).
DC alarm services	Point-to-point metallic services that connect subscriber premises with fire, police, or security services' monitoring locations. These services are delivered by the MDS2 shelf using DC circuit-emulation technology provided by <i>MCU</i> CUs from Tollgrade Communications, Inc.
D channel	The ISDN out-of-band (16 kbps in BRI) signaling channel that carries the ISDN user signals or can be used to carry packet-mode data.
Degrowth	The removal of circuit packs or traffic from a system via a provisioning operation (may be accompanied by the physical removal of associated equipment, but this is not required).
Digital bypass pair	A pair of MDS2 CUs (such as the <i>Tollgrade MCU-5405</i> CUs) that provide the equivalent of a metallic bypass pair without requiring a physical copper pair.
Digital data services	Digital data services refer to 64 kbps clear channel digital service provided between the customer and the CO.
Digital signal 0 (DS0)	One 56-kbps framed channel out of the 24 contained in a DS1 channel.
Digital signal 1 (DS1)	The North American standard 1.544-Mbps digital channel.
Digital signal 3 (DS3)	The North American standard 44.736-Mbps digital channel.
Distribution cable	The cable from the field side of an FDI to the customer's ready access case or distribution box, but not including the drop (formal definition) or inside wiring.
Downstream direction	Transmission direction from ATM data network or telephony switch to customer.
Drop	Formal definition is the short cable from an aerial ready access case or buried plant distribution box to the customer's house, not including inside wiring. Informally used, especially when describing test configurations like "splitting access," to be equal to line or loop. In this latter informal case (loop), it is all the copper cable to and including the telephone set.
Dropped cells	The number of cells that are dropped as a result of exceeding either a particular connection's traffic contract or the total allowable bandwidth of the shelf.

DS1 framing format	The prescribed recurring pattern of bits transmitted that enables the receiver to identify the start of a frame and the frame number in a sequence of frames. The system supports two different DS1 frame formats, extended superframe (ESF), or superframe (SF).
Dying gasp	A message the ATU-R transmits to the ATU-C when its electrical power is being shut off. The message indicates to a service technician or an administrator that an interruption on an ADSL line was caused by a power interruption at the ATU-R and not caused by a transmission failure or an <i>AnyMedia FAST</i> shelf failure.

E

Errored cells received	The number of cells that the shelf received from the CPE with detected errors.
ES on upstream SDSL line	The corrected HEC error counter (CORRCNT) and the uncorrected HEC error counter (UNCCNT) event counter data are accumulated and mapped to ES. The total count in one second is the number of ESs. The HEC error counter data is accumulated, and the ES counts are reported on a 15-minute and 1-day basis. The CORRCNT counter tracks the number of corrected HEC errors. The UNCCNT counter tracks the number of uncorrected HEC errors.
Ethernet	A LAN that uses the CSAM/CD media access method and operates at 10 Mbps, usually over coax medium.

F

Fault management	Consists of a set of functions, such as testing, that enable the detection, isolation, and correction of abnormal operation of the telecommunications network and its environment.
Feeder cable	The portion of a customer loop from the central office switch (integrated), or from the main distribution frame (MDF) to the office side of the feeder/distribution interface (FDI). In the case of DLC it includes the DLC line plus any copper cable from the RT to the FDI.
Fixed wireless network	A digital loop carrier (DLC) system that uses wireless (radio) transmission through the air as the distribution medium to the home, replacing the traditional copper wire outside plant. A radio unit is mounted on the outside of the home (network interface unit) and is connected to standard twisted pair wiring within the home.
FLASH memory device	A nonvolatile memory device that may be reprogrammed in the field through software download.
Front and rear access	The mounting of the bay with its back away from a wall, etc., which allows access to the rear of the shelves.
Front-only access	The mounting of the bay with its back next to a wall, etc., which prohibits access to the rear of the shelves.

Full-rate ADSL	The version of asymmetric digital subscriber line (ADSL) defined by ANSI T1.413.
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G

General user	User login that allows access to all messages except those for Security Management messages that affect other users, such as login creation and deletion, and password modification for all user classes.
---------------------	---

Generic signaling function	A parameter required for provisioning of subscriber service. The generic signaling function is used to condition the <i>AnyMedia</i> FAST shelf loop interface circuit to provide the desired signaling protocol. The values are based on Network Channel Interface (NCI) codes described in Telcordia Technologies, Inc. TR-TSY-000335.
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GET	The simple network management protocol (SNMP) operation used by the OS to retrieve specified information such as the values of MIB variables.
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Global ATM parameters	Includes the <i>FAST</i> shelf VPIs and the ATM operations channel VPI and VCI (also known as ATM OAM&P PVC).
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Graphical system interface (GSI)	The GSI is part of the Management Interface package of software that is an interface to control and maintain the <i>AnyMedia</i> FAST shelf telephony and data services and subshelves.
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H

Hi-cap	High capacity (hi-cap) subscriber services direct DS1 paths from subscriber equipment to the serving CO.
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High BER on ADSL line	Ten consecutive seconds with each second having one or more of the following anomalies: — At least 18 ADSL superframes with ADSL CRC anomalies — At least 0.1 seconds in which the received power has dropped to 6 dB below the reference power — At least one ADSL superframe with synchronization anomalies.
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High BER on upstream SDSL line	The SDSL signal received from the CPE is considered to be in a high-BER condition when ten consecutive SESs have occurred. The high-BER condition is cleared when ten consecutive seconds have occurred that are not SESs. The system tracks SESs for the SDSL signal received from the CPE. An SES for upstream SDSL transmission is observed when either of the following conditions exists during a given clock second: — If the number of HEC errors (corrected and uncorrected) divided by the number of cells received is greater than or equal to 0.3, then SES occurs. — If at least one los or lof occurs, then SES occurs. If an auto change in bit rate occurs, start over in both cases.
High bit rate digital subscriber line (HDSL)	A method of transmitting T1 over twisted-pair copper lines. Unlike other DSL types, HDSL uses four wires (two pairs). HDSL supports 1.544 Mbps full-duplex transmission.

I

IAT01	IAT01 indicates an IAT type supported by a proprietary (modified D4) interface such as <i>ConnectReach</i> Terminal and <i>ConnectReach 200</i>.
IAT02	IAT02 indicates an IAT type supported by a D4 open interface.
IATSI view	A window available on the GSI that is launched by executing the ACT - IAT TL1 command.
IMA group	An operational collection of IMA links that functions to multiplex and de-multiplex ATM cells in a cyclical fashion among the links, to form a higher bandwidth logical path between a pair of IMA terminals separated by multiple feeders. The AFMDS1 pack uses one group and up to eight links, with a direct, one-to-one mapping between the links and feeders.
IMA link	A circuit path within the AFMDS1 that connects its feeder interface with a circuit that combines the link's broadband payload (ATM cells) with the payload of other links, in the downstream direction, and distributes the composite ATM payload cells among the links in the upstream direction.
Integrated access device (IAD)	A device on the customer premises that consolidates traffic from several subscriber interfaces into a single pipe. Often, the pipe connects to a host terminal that consolidates traffic from several IADs into a larger pipe.
Integrated configuration	A remote terminal (RT) connected to a local digital switch (LDS) digital interface without a central office terminal (COT).

Integrated Mechanized Loop Testing (IMLT)	IMLT is a feature of the 5ESS switch that allows LoopCare (formerly MLT) to use the directly connected test unit (DCTU) of the 5ESS switch to make metallic tests on subscriber loops (including those on digital loop carrier systems).
Integrated services digital network (ISDN)	CCITT I-series recommendation that defines the digital network standard for integrated voice and data network access and services and user-network messages.
Inventory management	Consists of a set of functions to track, report, and ensure adequate supplies of equipment.

L

Latency	In the <i>AnyMedia</i> Access System, this parameter is used to choose whether or not interleaving is used on an ADSL circuit. If the latency parameter is set to Interleaved, then interleaving is used. If the Latency parameter is set to Fast, then interleaving is not used. This parameter is called Latency because the amount of transmission delay through an ADSL transmission span is affected by interleaving.
Legacy services	A large set of service types traditionally supported by the DLC network element (NE).
Lightguide build out (LBO)	An attenuation network for optical signals between ATM circuit packs in an ATM switch or multiplexer and the AFMOs in an <i>AnyMedia</i> shelf, or between separate AMFOs in multiple <i>AnyMedia</i> shelves in a daisy chain. LBO guarantees the proper signal level.
Line	Formally represents the connection from the customer's telephone to the switch. Has been recently used to represent the copper cable from the DLC channel unit's or application pack's tip/ring output to the customer's telephone. Used equivalent to "loop," but usually does not include the telephone set.
Local login	Login into the <i>AnyMedia</i> Access System via the CIT or External System LAN 10BaseT interface from the collocated GSI or dumb terminal.
Local test desk	LTD is a test position located in a local end office that is capable of accessing and making metallic tests on subscriber loops served out of that office (including those on digital loop carrier systems).
LOF on ADSL line	ADSL frame synchronization has been lost at the ADSL for at least 2.5 seconds.

LOF on upstream SDSL line	The SDSL signal from the CPE is considered to be in a LOF condition after 2.5 ± 0.5 seconds of contiguous lof defect. The LOF condition is cleared when 10 ± 0.5 seconds have occurred that do not have the lof defect. The loss of cell delineation (LOCD) event counter data is mapped to lof. The firmware collects this 0.5-second interval data. If there are 2.5 seconds of contiguous lof, it is considered to be LOF. This LOCD event counter data is accumulated and reported on a 15-minute and 1-day basis.
Logical ports	Port assignments made through software, as opposed to actual, physical ports.
Loop	Formally represents the connection from the customer's telephone to the switch. Has been recently used to represent the copper cable from the DLC channel unit's or application pack's tip/ring output to the customer's telephone. Used equivalent to "line," but may include the telephone set also.
LOS on ADSL line	Received power has dropped to 6 dB below the reference power. The timing threshold is as follows: — Downstream: 1.5 seconds — Upstream: 2.5 seconds.
LOS on upstream SDSL line	The loss of signal interrupts are timed, accumulated, and stored and are mapped to los. The loss of signal timeout (LOST) is used to time the los. If the LOST bit is set, then it is a LOS condition. The firmware collects this data, accumulates it, and reports the number of los occurrences on a 15-minute and 1-day basis. The LOS failure parameter is the accumulated los.

M

Management Interface	The Management Interface is a package of software that is used for managing traditional DLC services and ATM xDSL services. The Management Interface allows the user to provision a single NE at a time through its GSI, while simultaneously monitoring alarms of multiple NEs through its Network Maintenance Manager. It is installed on a personal computer running under the <i>Windows</i> operating system.
Management information base (MIB)	Declaration of a collection of objects that defines the network or network element (NE) for a given interface protocol. For example, there is a MIB defined for access using the simple network management protocol (SNMP) and a different MIB defined for access using the protocol of the GR-303 Embedded Operations Channel (EOC).
Metallic bypass pair	A physical copper pair running between the CO and the RT site that allows a test head located at the CO to perform metallic tests on RT subscriber drops.

Multiplexing	The technique of combining multiple single channels onto a single aggregate channel for sharing facilities and bandwidth.
Multi-point grounding	The circuit and frame (earth) grounds are tied together at each piece of equipment. This allows battery return to use the building ground as a path. (See single point grounding.)

N

Narrowband services	Services include voice and voice-frequency data transmission.
NE name	The network element (NE) name is a unique provisioned name given to an <i>AnyMedia</i> shelf. This name is identified by the GSI as the site ID.
Network Maintenance Manager	The Network Maintenance Manager is part of the Management Interface package of software that is used to monitor alarms over multiple NEs. The Network Maintenance Manager allows a user to choose which NEs to monitor, to filter viewed alarms, and to manage the display of these alarms
Nonvolatile data storage (NVDS)	That part of the database which is retained even after a power failure, for example, provisioning parameters.
Nonvolatile program storage (NVPS)	Nonvolatile memory on the COMDAC and the AFM used to store the load image.

O

Open systems interconnection reference model (OSIRM)	A seven-layer model that defines the protocol standards for data communications.
Operations system (OS)	A centralized system of software and/or hardware for remotely testing or administering telecommunications equipment (e.g., SARTS, LoopCare [formerly MLT], OPS/INE, etc.)
Optical carrier level <i>N</i> (OC-<i>N</i>)	The optical carrier level signal in SONET that results from an STS- <i>N</i> signal conversion. In SONET, the basic transmission speed unit is 58.34 Mbps.
Overlay solutions	Additional infrastructure to carry new services.

P

Packet switch public data network (PSPDN)	A public data network that utilizes packet switching technology (X.25, SMDS, ATM).
Performance management	Consists of a set of functions to evaluate and report on the behavior of telecommunication equipment and the effectiveness of the network and/or network elements (NEs).

Permanent virtual circuit (PVC)	A logical dedicated circuit between two user ports in a point-to-point configuration.
Physical layer convergence protocol (PLCP)	The IEEE 802.6 standard that defines the physical layer that adapts the actual capabilities of the underlying physical network to provide the services required by the ATM layer.
Private (automatic) branch exchange (PBX/PABX)	A customer-site telephone switch.
Privileged user	User login allows access to all TL1 commands and GSI capabilities.
Protected pack	A circuit pack for which there is a backup. Protection may be one-to-one, or it may be one-to-more-than-one (1:n).
Protection switching	A reliability feature that causes service to switch to the backup equipment during faults or testing.
PSD of ADSL transmission	The actual ADSL transmit power level. This value may be lower than the provisioned PSDM.
PSDM of ADSL transmission	A provisionable value representing the maximum allowed ADSL transmit power level. The ADSL transceiver may choose a lower power level based on line conditions.
Pulse code modulation (PCM)	Modulation in which an analog signal is sampled and the sample is quantized and coded. Standard North American sampling is 8,000 times per second with 8 bits representing each sample pulse, giving a transmission rate of 64 kbps.

Q

Quality of service (QOS)	An indicator of the performance of a transmission system on the Internet and other networks. QOS is measured in transmission rate, error rates, latency, and other characteristics.
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R

Remote login	Login into the <i>AnyMedia</i> Access System via IAO LAN, ROC, or External System LAN (over TCP/IP DCN) from OSs, EM, or GSI.
Reports-only user - broadband	User login that allows access to GET messages for retrieving system information and autonomous reports. Reports-only users do not have access to any SNMP messages that create, change or remove service or to any security messages that affect other users.
Reports-only user - narrowband	User login that allows access to a limited set of TL1 messages, for retrieving system information and autonomous messages. Reports-only users do not have access to any TL1 messages that create, change or remove service to any security messages that affect other users.

RFI on ADSL line	ADSL frame synchronization has been lost at the ATU-R for at least 1.5 seconds.
Right-of-way	Permission to have access to specified local network and to use a specific portion of it.
Ring	A closed-loop, common bus network topology.
Router	A LAN/WAN device that operates at layers 1 (physical), 2 (data link), and 3 (network) of the OSIRM. Distinguished from a bridge by its capability to switch and route data based upon network protocols such as IP.

S

Sealing current	5 mA current used (historically) to prevent oxidation buildup on tip/ring pairs.
Security management	Consists of a set of functions that protect telecommunications networks and systems from unauthorized access by persons, acts, or influences, and to track and report access attempts.
SET	The simple network management protocol (SNMP) operation used by the OS to change the value of specified information such as a MIB variable.
Shelf daisy-chain	Connecting <i>AnyMedia FAST</i> shelves to daisy-chain AFMs together for ADSL services only.
Simple network management protocol (SNMP)	Used by the OS and the GCT for the <i>AnyMedia FAST</i> shelf broadband product for accessing the MIB objects.
Single point grounding	The circuit and frame (earth) grounds are tied together at a single specific point of the central office. This does not allow the battery return to use the building ground as a path. (See multi-point grounding.)
Site ID	A unique provisioned name given to an <i>AnyMedia</i> shelf. This name is identified by the <i>AnyMedia</i> Element Manager as the NE name.
SNR margin of ADSL line	The increase in noise, relative to the current received noise power, that can occur with a BER of 10^{-7} still being met.
Software upgrade	Installing newer system software.
Standby	A backup circuit pack or system entity that may be activated during a equipment failure or testing.
Switch consolidation	Grouping telecommunications lines (increasing density) for better efficiency, ease of maintenance, reduced cost, space, etc.

Symmetric digital subscriber line (SDSL)	A physical layer technology used to transport digital bit stream over one pair of nonloaded existing copper distribution cable. SDSL provides equal transmission bit rates for both the upstream and downstream directions ranging from 144 to 2320 kbps. SDSL is based on use of the 2B1Q line coding scheme. 2B1Q-SDSL is a baseband line coding scheme that does not allow the option to share the copper loop from a baseband POTS signal.
Synchronous optical network (SONET)	A United States high-speed, fiber-optic transport standard for a fiber-optic digital hierarchy (speeds range from 51.84 Mbps to 2.4 Gbps).

T

T1	A four-wire repeater system; commonly used to refer to a DS1 signal.
T1 carrier	The TDM digital T1 hierarchy used in North America and Japan with 24 voice channels constituting a single 1.544-Mbps T1 trunk.
TDR testing	A type of wideband metallic drop test in which a test head sends a narrow-width pulse over a subscriber loop and looks for any returned pulses that were reflected back from the loop.
Test operations system	Any of a number of testing systems used to perform channel and drop testing, such as Lucent Technologies LoopCare (formerly MLT) system and PGTC-compatible test systems for channel testing.
Threshold crossing alert	A threshold is a value assigned by the system user to a certain desired level (e.g., errored seconds); when the level is exceeded, a threshold crossing alert is issued.
TL1 system interface (TL1SI)	Any ASCII terminal connected to a port via an EIA-232E/574 format that uses TL1 commands to turn up a system and perform maintenance, provisioning, and other system operations.
TL1SI view	A window available in the GSI by launching a TL1SI view window through the GSI of the <i>AnyMedia</i> Management Interface.
Token	A marker that indicates the station's right to transmit that can be held by a station on a token ring or bus.
Transmission control protocol/Internet protocol (TCP/IP)	The combination of a network and transport protocol developed by ARPANET for internetworking IP-based networks.
TRAP	The simple network management protocol (SNMP) operation used by a network element (NE) to send an autonomous report.
Twisted pair (TP)	The basic transmission medium consisting of 22 to 26 American wire gauge (AWG) insulated copper wire. TP can be either shielded (STP) or unshielded (UTP).

U

Universal communication channel (UCC)	A DS0 communications path between a COT and an RT of a universal <i>AnyMedia</i> Access System. The UCC is used as a LAN extension to allow a remote operations system to provision and monitor the RT via a COT that is connected to the data communications network.
Universal configuration	A remote terminal (RT) connected to a central office terminal (COT) capable of providing an analog interface to a local analog or digital switching system.
Upstream direction	Transmission direction from customer to ATM data network or telephony switch.
User security classes	Refers to different user groups, each assigned with certain system access privileges. See Privileged User, General User, and Reports-only User definitions.
User-to-network interface (UNI)	The point at which the user accesses the network.

V

Virtual channel (VC)	A virtual link defined at an ATM interface. The lower of the two levels of cell multiplexing defined for ATM.
Virtual circuit (VC)	A voice communications link that appears to the user to be a dedicated point-to-point circuit.
VF cables	Refers generically to the tip/ring pair cables that attach to the faceplates of all APs, including the telephony and ATM xDSL APs.
VF growth	Increased demand for voice frequency capacity.
Virtual channel identifier (VCI)	A sixteen-bit field in the ATM cell header that uniquely identifies the virtual channel link with which the cell is associated. This identifier is of local significance only. It provides the lower of two levels of multiplexing.
Virtual path identifier (VPI)	In ATM, a field within the cell header that is used to switch virtual paths, defined as groups of virtual channels (VCs).
Voice frequency data enhancement (VFDE)	The feature of the <i>AnyMedia</i> FAST shelf that enhances the GR-303 interface to improve modem performance. Also see <i>ClearReach</i> feature.
Voice over DSL (VoDSL)	An application requiring a gateway that converts the voice signal from a digital switch to ATM format for transport toward the customer premises. Special CPE is required at the customer premises to provide the voice service.
Volatile data storage	Data storage (e.g., RAM, that will lose information when power is lost).

Virtual path (VP)	A virtual link defined at an ATM interface. The higher of the two levels of multiplexing defined for ATM. Used to transport an aggregation of virtual channels (VCs) between network locations in a manner somewhat analogous to a DS3 transporting multiple DS1s.
Virtual path identifier (VPI)	An eight-bit field in the ATM cell header that uniquely identifies the virtual path link with which the cell is associated. This identifier is of local significance, across an ATM interface. It distinguishes the data of one virtual path from the data of another, thus providing the higher of two levels of multiplexing.

W

Wide area network (WAN)	A network that operates over a large region and commonly uses carrier facilities and services.
Wire center consolidation	Grouping a number of central offices into one center.

X

xDSL	Refers to a variety of DSL services, such as HDSL, HDSL2, SDSL, and VDSL.
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